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### *The Seine Bridges at Paris.*

ATTENTION has been made several times of the large railway station which it is proposed to establish on the Esplanade des Invalides, at Paris, to serve as a terminus to the Moulineaux Railway. This scheme will involve the construction, opposite to the Ministry of Foreign Affairs, of a bridge intended to connect the new railway station directly with the Quai de la Conference and the Champs Elysées.

This will raise to the number of twenty-nine the bridges crossing the Seine within the area of Paris. As most of these bridges have some historic associations connected with them and have each their own characteristic physiognomy, and as they form an important feature in the general picturesque and architectural effect of Paris, it may be of interest to give some brief account of these structures, containing in part information which is not obtainable from the ordinary sources of guide-books.

Following the course of the Seine down stream, we come first on the "Pont National," a bridge which till 1870 bore the name of "Pont Napoléon," and which forms the crossing for the chemin-de-fer de ceinture at the eastern extremity of Paris. Like most of the constructions built under the Empire, the bridge was re-christened under the Third Republic. It was built in 1853, and is composed of five semicircular arches built in stone. A wrought-iron railing which divides the bridge from end to end separates the railway from the road reserved for ordinary vehicles and foot-passengers. The initial of Napoléon III. crowned with an oak garland forms the only decoration of the bridge.

We come next on the "Pont de Tolbiac," an iron bridge constructed in 1879-1884, as a prolongation of the road after which it is called. It connects the warehouses of Bercy with the Quai de la Gare. The next bridge, the "Pont de Bercy," was built in 1864. Neither of these present any point for special mention.

The "Pont d'Austerlitz," originally constructed of iron, has been entirely rebuilt of stone some years ago. It is a large bridge with a heavy traffic, which connects the Quai de la Rapée with the Place Walhubert, adjoining which are the railings of the Jardin des Plantes. At this point the Seine divides into two parts which embrace successively the Île St. Louis and the Île de la Cité. At the eastern extremity of the first of these islands, opposite the Hôtel Lambert, is a bridge divided into two parts, the "Pont Sully," completed in 1876. This double bridge connects the Boulevard St. Germain, the largest thoroughfare on the left bank, with the Boulevard Henri IV. Three iron arches with stone abutments compose the part which extends between the Boulevard St. Germain and the Ile St. Louis. Previously this portion of the river was crossed by a suspension bridge, called the Pont de Constantine. It gave way and fell into the Seine some years before the war. The second part of the Pont Sully connects the Île St. Louis with the right bank; there is connected with it a light foot-bridge on piles, accessible only to foot passengers, and which connects the Île St. Louis with the Quai Henri IV. This passage-way, which can hardly claim to be a bridge, is known however by the name of the "Pont de l'Estacade." The Pont de Sully itself, the part connected with the right bank, consists of an iron arch abutted on each side against a stone arch.

Proceeding along the right bank, we come to a bridge commenced in 1604 and terminated in 1635, called the "Pont Marie" (see lithograph). It was originally covered with houses which were partly carried away by a rising of the Seine in 1698, and were entirely pulled down and removed in 1789. The name of Marie is that of the engineer under whom it was built; it is composed of five semicircular arches in stone, of which the piers are decorated with niches empty of their statues.

The "Pont Louis Philippe," which follows next, was built in 1833, which title was changed in 1848 to that of "Pont de la Réforme," the old name being subsequently restored. At first a suspension bridge, it was rebuilt in masonry in 1862, and consists now of three elliptical arches separated by two piers.

Between this bridge and the following one, on the bank of the river, is the fruit market known under the name of the "Mail." It is here that in autumn the heavy barges laden with apples from Normandy and raisins from Bourgogne and Fontainebleau are unloaded. The "Pont d'Arcole," which is the next in order, is of comparatively recent date, but the origin of its name, oddly enough, is already obscure, and it is disputed whether it received its name as a souvenir of Napoléon's victory at Pont d'Arcole, or whether it is to perpetuate the name of a young insurgent who was killed at this point, in 1830, with arms in his hand, as he was leading the people to the Hôtel de Ville. The incendiaries of the Commune in 1871 having destroyed the municipal archives, it is now impossible to ascertain the facts, but we should doubt very much whether the Government of Louis Philippe would thus have consecrated the recollection of a barricade combat which would have formed a memento of its own revolutionary origin. The bridge, which is situated between the place de l'Hôtel de Ville and the street which conducts to the enclosure of Notre Dame, has gone through a good many vicissitudes. It was at first a mere suspension bridge for passengers, which, in 1856, was replaced by the existing bridge, an iron one of a single elliptical arch. This new bridge, which nearly failed two years ago, has had to be almost entirely reconstructed.

On the site of the Pont Notre Dame, which is the next in order, there was at the end of the fourteenth century a wooden bridge called "Le Planche Mibray," replaced towards 1413 by another wooden bridge which carried sixty houses constructed on one plan and occupied by various trading corporations, with the exception of the money-changers and goldsmiths, whom we shall come upon just now on another bridge specially set apart for their residence. On October 24, 1499, the Pont Notre Dame gave way with all its houses, and after this catastrophe the Cordelier monk Jean Joconde was commissioned to build, in its place, a stone bridge carrying seventy houses. This became the ordinary place of celebration of the fêtes and solemnities given by the municipality of Paris. In 1590 the legate of the Pope there passed in review the army of the League. Lastly in 1660, the houses were adorned with statues

and medallions. Houses, statues, and all disappeared under the Revolutionary tempest, which suppressed even the original name of the bridge, which then became the "Pont de la Raison." After numberless reparations, it was rebuilt completely in 1853. Of the original work there remains only the lower portion of the piers and the voussoirs of the arches. We may just refer to the fountain which was a few years ago affixed to the centre arch. It was adorned by a bas-relief by Jean Goujon and a portrait of Louis XIV. accompanied by a Latin inscription written by the poet Santeuil.

The "Pont au Change," the name of which explains itself, and which was at first a timber bridge, connects the Place du Châtelet with the Boulevard du Palais. It is there that the goldsmiths and money-changers resided in the low and damp houses built along the two parapets. Many times carried away by floods, and rebuilt sometimes in wood sometimes in stone, it was never rebuilt in a really solid manner until 1639, from which time it lasted till 1859, the date of its last transformation. The houses which had encumbered it had a long time before disappeared, at the time when it was proposed to reconstruct it as it is at the present time, of three elliptical stone arches, and with parapets and square balusters. There existed for a long time, at the end of this bridge, a small monument in black marble raised in honour of Louis XIV., whose figure was represented on a pedestal, with Louis XIII. and Anne of Austria by his side.

We now arrive at the Pont Neuf, one of the most interesting of all the bridges both for its antiquity and the recollections which attach to it. The first stone was laid on May 31, 1578, in the presence of King Henri III. Androuet Ducerceau directed the works, which the civil wars, however, soon interrupted. It was not till 1602, under Henri IV., that the work was taken up again under the direction of Guillaume Marchant, architect to the king. The bridge is carried on twelve circular arches, above which is a console cornice which Germain Pilon decorated with some very original grotesque masks of remarkable execution and of great variety of expression. When, in 1848, a general repair of the bridge was made, its primitive style was carefully preserved, even while suppressing the semicircular stone balconies which had developed themselves above each pier. The bridge was lowered, but the masks of Germain Pilon were reproduced from the original models in the Cluny Museum. It was in 1835, under the Ministry of Richelieu, that the platform of the Pont Neuf was adorned with the statue of Henri IV. The Revolution, which respected nothing, assumed naturally the right to destroy this fine monument, the work of John of Bologna. The existing statue, executed under Louis XVIII., is the work of Baron Lemot. With the Pont Neuf is connected the recollection of a fountain ornamented with a carillon clock, on which was a group in lead, gilt, representing Jesus and the Woman of Samaria, which gave its name to the fountain, once celebrated, but which has now disappeared.

This old stone bridge, which was regarded as so solid a structure as to have given rise to a proverb, "Solide comme le Pont Neuf," was built to replace a wooden bridge of the Mediæval period, several times destroyed and reconstructed, and which was called at successive periods "Pont aux Colombes," "Pont aux Meuniers," and "Pont Marchand."

If we retrace our steps to take the narrow arm of the river, we come successively on the "Pont de la Tournelle," the "Pont de l'Archevêché," the "Pont St. Louis," the "Pont au Double," the "Petit Pont," and the "Pont St. Michel." The first-named of these, formerly a timber bridge, was carried away by a flood in 1637 and again in 1651. Rebuilt in stone in 1654, it was finally rebuilt again in 1847, as it now exists, with six circular arches of unequal width. It unites the Quai de la Tournelle with the Quais de Bethune and d'Orléans. The Pont de l'Archvêché is situated between the quai of that name and the Quai de Montebello. It dates from 1828, and has two abutments and two piers and circular arches. The Pont St. Louis is an iron bridge of one elliptical arch, and connects the Quai aux Fleurs with the Quai Bourbon. The Pont au Double owes its name to the obligation imposed by Louis XIII. on horsemen crossing the bridge to pay a toll of a "double tournois" (an old French coinage). The demolition of the old Hôtel Dieu necessitated the reconstruction of the Pont au Double, which is now an iron bridge, opened in 1882. The Petit Pont was formerly surmounted by houses. It was rebuilt in 1851, and is now a bridge of a single stone arch, uniting the Rue de la Cité with the Quai St. Michel. The Pont St. Michel, built as a prolongation of the Pont au Change, is of the same design (see lithograph); it was built in 1857, replacing a former bridge, which was ornamented with a statue of Louis XIII.

Next to the Pont Neuf, which terminates the Île de la Cité, is the Pont des Arts, with stone abutments and piers carrying nine iron arches. It forms the communication between the Quai du Louvre and the Place de l'Institut, and its name is derived from the Louvre itself, which was formerly called the "Palais des Arts." It is a foot passenger bridge only, and was built in 1802-1804.

The Pont du Carrousel, or des Saintes Pères, was opened to traffic in 1834, and consists of three iron arches formed of tubes of elliptical section. Four statues executed in 1847 by Petitot stand at the ends of the bridge, and symbolise Abundance, Industry, the City of Paris and the Seine. This bridge, which unites the Quai du Louvre with the Quai Voltaire, is one of those with the largest traffic, but it has the serious fault that it is not on the axis of the road on either bank. Accordingly it is destined to be either removed altogether, or to be rebuilt opposite to the arcade of the Louvre called the "Guichets Lefuel."

The "Pont Royal," so named because Louis XIV. bore the expense of its construction, was built in 1685, from the designs of Romain and Mansard. The bridge is composed of five stone arches, and succeeded to a former bridge called the Pont Rouge, which had itself succeeded to a ferry-boat which formerly was the means of communication between the Tuileries and celebrated promenade of the Pré aux Clercs. It was called the "Pont National" in 1792, the "Pont des Tuileries" in 1804, but in spite of political vicissitudes it has finally returned to and preserved its original name.

The "Pont Solferino" dates, of course, from the Italian war, and owes its name to the French victory gained at Solferino. It is a three-arched iron bridge with piers and abutments of masonry, built on the axis of the Rue Solferino.

The "Pont de la Concorde," which connects the Place de la Concorde with the Chamber of Deputies, was the work of the celebrated engineer Peronnet, to whom we also owe the Pont de Neuilly. It was completed in 1793. It consists of five large circular arches in masonry, and has parapets and balusters interrupted by massive pedestals intended for a series of statues. These statues are now in the Cour d'Honneur at Versailles, and there has at various times been talk of replacing them by some other design for completing the decoration of the bridge. With this purpose, for instance, M. Duc was commissioned, fifteen years ago, to make a study for a new design of steles terminating in lamp-brackets and grouped with decorative figures of children. The death of the eminent architect cut short this project, which would probably otherwise have been approved and carried out.

The next bridge, the "Pont des Invalides," has been many times rebuilt. It was demolished first in 1826, and replaced by a suspension bridge which in 1854 was judged to be insufficient for its position, and was succeeded by a stone bridge with four arches. The bridge was considerably injured in 1874 by a flood of the Seine, and extensive repairs to it had then to be carried out. It is one of the few bridges in Paris which possesses sculptural decoration of considerable interest. The piers are decorated with trophies and with two figures carved in stone executed by Dieboldt and Villain, symbolising the victories of the French armies by land and sea.

The next bridge, the "Pont d'Alma," which faces the avenue of the same name, also possesses sculptural decoration in the shape of four figures on the piers, representing a Zouave, a grenadier of the Imperial Guard, an artilleryman, and a chasseur à pied. The two first-named are from the chisel of Dieboldt, the two others are the work of Arnaud. The bridge, finished in 1856, has three elliptical arches. We need not remind the reader how important a part this bridge has played in the Paris International Exhibitions: it is the principal artery connecting the right bank with the Champ de Mars. The next bridge, the Pont d'Jena, was of the same importance in connexion with the exhibition, as it forms the direct communication between the central axis of the Champ de Mars and the Trocadéro, and thus made part of the exhibition territory itself. It was constructed in 1813 and was nearly being destroyed by Blücher in 1815. Louis XVIII. made however great and successful exertions to save it. The four equestrian groups which adorn the parapets date from 1848; they are as follows, a Greek horseman, by Devault; an Arab horseman, by Feuchères; a French horseman, by Préault; and a Roman horseman, by Daumas. Above each pier is an eagle with palms, carved in the stone.

The special situation of the last-named bridge, which became during exhibition time closed except to the visitors to the exhibition, necessitated the construction, in 1878, of a small foot-passenger bridge over the two arms of the Seine separated by the Île des Cygnes. This light iron bridge, called the Pont de Passy, connects the Quai de Grenelle with the Quai de Passy.

The "Pont de Grenelle," which follows next, forms the access to a number of mills in the quartier de Grenelle, from which the bridge takes its name. It was finished in 1827, and consists of two parts separated by the Île des Cygnes, the western extremity of which is now decorated by the replica, on a smaller scale, of Bartholdi's Statue of Liberty. The bridge itself has no kind of artistic character.

With the "Pont-viaduc du Point du Jour" we arrive at the extreme limit of Paris, contiguous, on each bank, to the ditch of the fortifications. The form of the bridge (see lithograph) seems to have been partly suggested by that of many of the ancient Roman aqueducts, such as the Pont du Garde. The bridge serves at once for the passage of the chemin-de-fer centrale and for the military road which runs parallel with the fortifications, and for ordinary vehicles and foot-passengers. The bridge proper is composed of five elliptical stone arches. Above it is the viaduct carrying the railway on a long arcade also of stone, which extends far on to the banks on each side.

This bridge, which has a fine effect as a whole, and makes a dignified architectural termination to the view down the river towards Bas Meudon and Billancourt, has no decoration except some sculptured laurel crowns forming frames to the initials of Napoleon III., under whom it was built in 1866, by two engineers of the municipal service, MM. Villiers and Bassompierre. This bridge, which in its double character may be compared to the high-level bridge at Newcastle-on-Tyne, terminates, not ineffectively, our excursion among the Paris bridges.

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Institution of Mechanical Engineers.—The forty-fourth annual report of the Council, presented to the members at the annual general meeting on the 29th ult., shows good progress during the past year. At the end of last year the number of names of all classes on the roll of the Institution was 1,945, as compared with 1,858 at the end of the previous year, showing a net gain of 87. During 1890, there were added to the register 160 names, against which the loss by deceases was 31, and by resignation or removal 42.

## RECENT ARCHÆOLOGICAL WORK AT ATHENS.

THE various archæological schools at Athens are now in full session, and lectures and meetings are taking place regularly. Six students have been this year admitted as members of the British school, and, for the first time, one of them is a lady. This number is already greater than that of any of the other three foreign schools, and it probably may be increased before the close of the term. The Director, Mr. Ernest Gardner, returned to Cambridge after Christmas to give a course of lectures in connexion with his college, but he goes back to Athens at Easter. Meanwhile, Mr. Penrose is supplying his place, and his venerable figure is to be seen again on the Acropolis busily continuing the investigations of his earlier years and seeking fresh points by which he can decisively floor, in friendly combat, the brilliant theories of his able antagonist, Dr. Dörpfeld.*

The excavations at Megalopolis were continued during November and December on the site of the Agora, on the opposite side of the river from the theatre which was unearthed last year; but the exceptionally rainy autumn very considerably impeded the progress of the work. Mr. G. F. Richards, Fellow of Hertford College, Oxford, and Craven Student of his University for 1890-91, has been taking the main charge of this portion of the work, and we hope, very shortly, to publish a note from him giving his views on the various points opened up. The complete clearance of the theatre site required by the Greek Government's Inspector-General of Antiquities will not be proceeded with till the spring.

The opening meeting of the school was held on Friday, December 26, when the Director (Mr. Gardner) introduced the subject of the theatre at Megalopolis for the first time to an Athenian audience of the present day, and Mr. Richards discussed the bearing of a Naples relief upon an archaic slab discovered on the Acropolis, probably representing Hermes and the Charites, with a smaller attendant figure. The special interest attached to a paper on the theatre brought together a representative audience of archæologists, numbering about fifty, and including Dr. Dörpfeld. In three lectures delivered by him at the Theatre of Dionysos on December 20, 27, and January 10, Dr. Dörpfeld still maintained, with his usual emphasis and lucidity, his view that the Greek theatre had no stage, and he alluded to the continuous flight of several steps leading down to the orchestra, which has been discovered at the theatre of Megalopolis, and which he had seen last year in a preliminary stage of partial excavation, as less likely to be steps than merely the foundations of a columned front.

Christmas was saddened in archæological circles by the melancholy death of Dr. Henry Schliemann at Naples. No one's loss could have been more keenly felt in Athens, where his kindly and ungrudging hospitality made his house a meeting-place and rallying point for all interested in the history of the past, and where his well-known figure will be largely missed for some time to come. Two days before the news of his death reached Athens, at a meeting of the German School Dr. Dörpfeld was discoursing on Troy and the results of their joint work during last summer, and the prospects of another season's further excavation, little thinking that in a few day's time his would be the mournful duty of accompanying his dead colleague's remains back to the Athens he was never to see again, and that their joint work was finished for ever.

The funeral took place on January 4, and an immense crowd assembled to testify their respect for his memory. A short and impressive funeral service, attended by the King of the Greeks and the Crown Prince, was held in the well-known house in University-street, the King's chaplain officiating. At the grave, M. Kavvadias, Inspector-General of Antiquities, and Dr. Waldstein, spoke of his life and work, and the veteran M. Rangabé, the Nestor of Greek archæologists, and a poet of no mean order, read a Greek ode which he had composed in his honour.

It is believed that Madame Schliemann intends to carry out to completion, as far as she can, what she knows would have been her late husband's wishes with regard to the excavations in progress at Hissarlik.

Dr. Waldstein and Mr. Gardner, at the subsequent meetings of the American and British schools, paid further tributes to Schliemann's memory, the latter alluding with special fitness to the meeting in London, the result of which was to finally establish the early date of his discoveries and their great value to science.

At the second meeting of the British School Mr. Gardner read a paper on "Cypriote Art," and Mr. Loring discoursed on a new and valuable fragment of the Edict of Diocletian, discovered at Megalopolis.

A third meeting was held more recently (January 30), when Mr. Penrose was welcomed back to Athens, and when, amongst other things, he described the way in which the ancients set out the curve of the volute.

At the opening meeting of the American School, Dr. Waldstein lectured on the temple statues from Lycosoura, in Arcadia. The large remains of these, which were discovered recently in the Temple of Despoina at that place, have now been removed to the National Museum at Athens, and Dr. Waldstein was able to illustrate his remarks with casts of the three heads and of the elaborately-carved piece of drapery from one of the figures. He confirmed the view which has been generally received by archæologists, that these statues were the work of Damophon of Messene, and he pointed out how they carried on in marble the tradition of the earlier treatment on the chryselephantine temple statues. Professor Richardson, of Dartmouth College, the annual Director of the American School, also read a paper on one of the inscriptions found in the course of the excavations of the school last year at Platæa. This year the school have obtained permission to excavate at Eretria, in Eubœa, and also on the supposed site of the Eleusinion, between the ancient cities of Psophis and Thelpusa, in Arcadia.

Mr. Gardner before his departure gave several dissertations on early vase-paintings, and Dr. Waldstein is regularly speaking on sculpture in the museums. Dr. Dörpfeld has been recently lecturing at the Stoa of Eumenes, the Odeion of Herodes, and the Asklepieion, and he has also paid a flying visit to Asia Minor, where Dr. Kern and Dr. Von Hiller are conducting interesting excavations on behalf of the Institute at Magnesia on the Maeander, chiefly at the temple of Artemis Leukophryene. M. Foucart has now left Athens, and his successor at the French School, M. Homolle, the excavator of Delos, is expected to enter on his duties as Director this month. It is now thought likely that this school will soon receive definite authority to commence the systematic excavation of Delphi, so there seems a prospect of this important work being at last begun before long.

The clearance of the stoa, west of the Tower of the Winds, in Athens, of which Mr. Aitchison some time ago sent us a sketch plan,* still continues, and many interesting fragments of late sculpture have been found, but there is no particularly new development to report. It seems to have been one of the most important buildings of the Roman Agora, and it is to be hoped that its relation to the structure north of the Horologium and to the stoa of Hadrian will be elucidated by further digging, for which purpose one of the old mosques, now used as the army bakehouse, is to be pulled down.

It is probable that interesting facts relating to the Greek Agora will be brought to light during the works now proceeding in connexion with the extension of the Piræus-Athens railway to the Place de la Concorde. The line is to be continued in a cutting from the present terminus to the foot of Athena-street, and from thence by a tunnel under that street till it reaches the square. It must therefore cut the line of the old street leading from the Dipylon to the Agora, and probably also part of one of the porticoes described by Pausanias.

The coming year seems to promise a continuance of interesting discoveries; at any rate, with so much archæological work projected, it can hardly be unfruitful in results.

* As is well known, Mr. Penrose quite disagrees with Dr. Dörpfeld's restoration of the old Athena temple on the Acropolis,

* See *Builder*, November 22, 1890.

## NOTES.

CONTESTS between federated employers and federated employés promise to be frequent and severe. The latter have voluntarily placed themselves under an iron hand, and the freedom for which their political friends are so clamorous, they seem to be bent on thrusting from them,—this, too, in that which is of the most vital importance to them,—their labour. In the strike which commenced last week at Cardiff we have the spectacle of the much-abused capitalist holding out for freedom, and the working-man fighting hard against it. Only a short time ago, the streets of London were daily paraded by bands of unemployed workmen carrying banners inscribed, "We demand the right to labour," — while the Cardiff dockers are claiming a right to prevent any man from working who has not signed away his freedom in the same way as they themselves have done. They are acting in obedience to the mandate of their self-imposed dictators, and hundreds of workers in no way connected with their organisation are in danger of being thrown out of employment through the cessation of work at the docks. The few coal-tippers who were the first to strike had absolutely no grievance whatever, ceasing work in accordance with orders received from their headquarters, simply because a ship they were about to load was not manned by a unionist crew; and resistance on the part of the officials to this unreasonable proceeding was the signal for a general outbreak. It is a significant fact that some of the older trade-unionists are actively engaged in endeavouring to arrest the progress of the strike,—evidently recognising the indefensible nature of the tyrannical principle underlying it. The dockers, both at Cardiff and at other ports, are being told by their leaders that the tyranny is on the other side, the way being thus prepared for enlarging the area of the strike.

JUDGMENT was delivered last week by the Railway Commissioners in a case of considerable importance, involving a decision upon the question of group rates. This, as the term implies, is a system under which the railway charges to or from a group of places situated in the same district are rendered uniform; and, so long as an undue preference is not created, the practice is legalised by the Act of 1888. In the case under notice, however,—the North Lonsdale Iron and Steel Co. *v.* Furness Railway and others,—the complainants argued that they were placed at a disadvantage through the operation of certain group rates, some of their competitors situated at a much greater distance from the markets than the North Lonsdale Works being charged just the same rates as themselves for the conveyance of material. The complaint had reference to both inward and outward traffic, and they obtained a favourable judgment in respect of pig iron forwarded, but the Commissioners were of opinion that no interference was called for in the other cases (coke and iron ore). The group rates for the pig iron traffic were condemned in consequence of places twenty miles from the North Lonsdale Works (from which similar traffic was carried) being included in the same group; it being held that this was unreasonable, and that the more distant works were given an undue preference. It is noticeable, however, that the Commissioners

did not intimate at what distance the line should be drawn, and it therefore follows that the whole question will have to be fought over again when any one considers himself prejudiced in a similar manner, and the favoured competitor is not so far distant as in this instance. Intending litigants who may look to this case for a precedent, should not fail to notice how the court dealt with the important question of costs, as the decision was rather peculiar, the complainants having to pay all their own expenses and half the costs on the other side as well. This was in consequence of their failure to establish their case on two of the three points brought forward, and the decision has been the subject of some adverse criticism. It will certainly discourage traders from coming before the Court unless they have a very strong case, as it is generally no light matter to be called upon to pay even a part of a railway company's costs in an action of this nature. The explanation of the Commissioners' ruling may probably be found in the fact that of the total estimated yearly overcharge (10,602*l.*) just about a fourth (2,500*l.*) was placed to the account of the traffic upon which the complainants succeeded, and the railway company were consequently condemned in a fourth part of the costs only.

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THE case of Butler *v.* Birnbaum, heard this week before Mr. Justice Stephen, though it is not concerned with the building trades, is of importance to all employés, as it shows that damages cannot be recovered from the employers for injuries sustained in carrying on the ordinary work of the firm, merely on the plea that some superior kind of plant or machinery would have rendered such injury less probable. In other words, a firm is not under any legal obligation to have the best plant possible. In this rather peculiar case the plaintiff had unquestionably suffered severely in health from the fumes of chemicals employed in a process in waterproof manufacturing, and evidence was brought to show that another firm employed a machine for the same purpose, in which there was a special cover for the trough in which the chemicals were placed, to shut in the fumes except during the time of use; also that the machine used by the defendants, owing to mechanical defects, obliged the men to come into closer contact with the chemicals in endeavouring to counteract these defects while the machine was working. The case, as the learned Judge said, was a very hard one for the plaintiff, and he wished the law could give him compensation; but as there was no legal obligation on any manufacturer to use the best machinery in existence, the plaintiff must be non-suited.

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THE remaining drawings submitted in the competition for the Municipal Lodging-house have been exhibited during this week at the offices of the County Council. Want of space prevents full reference to all the designs, but the quality of the work, with one or two exceptions, shows a keen desire to successfully grapple with the difficulties of a problem which has not previously received much attention, at any rate in this metropolis. Messrs. Florence & Satchell's drawings show an entrance in the centre of the Parker-street frontage, and a day-room on the right; the rest of the ground-floor and the upper floors are devoted to dormitories, for which ample lavatory accommodation is provided on each floor. The line of building is confined to a parallelogram, and does not encroach upon the recesses, and two areas are provided in the centre of the block. The elevations are kept studiously free from ornament, but are pleasantly treated. Messrs. Crickmay & Son submit some very creditable designs, which contrast favourably with many of their neighbours. It is to be feared that the question of cost has been prejudicial to their occupation of a better place in the competition. The plan is H-shaped, and is simple in arrangement; the entrance is placed in the centre, and on either side are office and shop. Parallel blocks at right-angles to the front contain on the ground-floor dining and day rooms. A staircase occupies a central position, and on each landing extensive lavatory accommodation is provided for the dormitories occupying the upper floors. The elevations are certainly some of the most pleasing to be seen in the exhibition, but the respectability of the exterior would have, we fear, a deterrent rather than an inviting effect upon the class for whom this accommodation is intended. Messrs. Quilter & Wheelhouse and Mr. Boyes, amongst others, have submitted carefully-thought-out designs. Various opinions appear to exist amongst the competitors as to the requirements of the future inmates, and some of the elaborate laundry and lavatory arrangements seem to us to be much in excess of the requirements or inclinations of the people for whom this accommodation is intended. The ironing-rooms and other conveniences, provided by some competitors, suggest a desire on the inmates' part for clean linen, whereas we fear that in many cases there will be an absence of linen. We heartily wish this scheme success, and should the multiplication of these houses tend to obliterate the lodging-houses which are little better than plague-spots dotted over the Metropolis, a great sanitary gain would be recorded. The class for which this accommodation is intended, however, is essentially shiftless and thriftless, and we much fear that the superior accommodation and cleanliness of these new houses,—connected, as it must be, with a certain amount of official supervision,—will fail to attract the right class from the smaller houses supervised by a "deputy" who is seldom much superior to themselves.

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MR. HINGLEY, M.P., has introduced a Bill to prevent gambling in pig-iron, which has of late become so notorious and so harmful to those who have to purchase the article for manufacturing purposes. The Bill declares that all contracts are void unless the contract shall specify a document to identify the actual material sold. It is probable that the ingenuity of those who gamble in this material will find some way out of the net which the Legislature will probably spread round them. But if the Bill passes into law and is at all successful, we do not see any sound reason why its scope should not be extended, so as to cover gambling in other materials. It is unquestionable that such gambling exists, and is not only harmful to those who engage in it, but, indirectly, also to those who have occasion to make use of the material which is the subject-matter of wagering contracts.

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A SHORT but very pointed paper was read by Dr. Louis Parkes on Wednesday evening at the Parkes Museum, on "Model Lodging Houses and Overcrowding on Space," the main object of which was to urge, what every one is beginning to see only too clearly now, that overcrowding vertically is as dangerous to health as overcrowding laterally. He concluded with a somewhat longwinded resolution, the purport of which was that the London County Council be memorialised to include, in the Bill they propose to promote for the consolidation of existing sanitary Acts, a clause giving power to make by-laws for enforcing the provision of adequate open area around buildings; a resolution which was carried unanimously. Dr. Poore, in an admirable speech, after observing that the possibility of carrying houses to an immense height depended entirely on water-supply under pressure, strongly supported the objects of the paper, with which we are quite in accord in the main, though some of the statements and arguments heard during the evening will bear a note of interrogation. When Dr. Poore, for instance, condemns wholesale all rooms beneath the level of the street, we may ask him whether, in such a street as Harley-street, for instance, he would think it a sanitary improvement to raise the kitchens entirely above the ground, and raise the whole height of the houses from the street level one story? We also very much question Dr. Parkes's rather sensational diagram showing the section of houses and courts as he avers they may be built under the Metropolitan Building Act. It is quite true that the clause providing a minimum area at the side or back of every inhabited house makes no account of the height of the house, and that the provision is very insufficient in the case of a building of four or five stories; but it is not in accordance with the Act that three five-storied blocks of houses can be built with a 10 ft. wide court between them. The Building Act is in many cases badly worded, and does not say clearly what it means to say, but the provision for open space in the rear of a building obviously refers to houses facing a street; otherwise why were the words "in the rear" used? It is loosely worded, no doubt, but that is the intention, and therefore Dr. Parkes's diagram was rather a misleading one. The suggestion that we must come to cheap railways and outlying villages around London was much applauded, but it is not so easy of realisation as some enthusiasts seem to think. If we go to the very root of the matter, we shall perhaps come to see that the thoughtless pressing into London from all parts of the country is the evil that will have to be stopped. London is itself one great phenomenon of overcrowding, and either a natural reaction, or legislation, will have to put a check on it sooner or later.

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SO many examples of public buildings have, within the last few years, sprung up in London, in which the use of marbles forms a considerable feature in the interior decoration, that it is not surprising to find the same materials lavishly used in the latest addition to the long list of London theatres. The vestibule, staircase, and foyer on the royal-tier stall level have been treated generally in much cooler tones than the auditorium itself. The walls of the staircase are of Derbyshire alabaster and the columns of a delicate green marble, while the lines of balustrade are more strongly marked in handrail and plinth by the use of "grand antique." The ceilings throughout this staircase are, like the panels of part of the auditorium, delicately painted with arabesques and figure-subjects on a pale green ground. As a contrast to the colder tones of the entrance and stairs, the columns leading to the foyer of the tier-stalls are of beautiful pink "Algerian" marble, the dado being of still richer rouge jasper. The ceilings are rich in plaster decoration relieved by gold, and the walls here, as in the vestibule below, are of the Pavonazza marble of Italy. The richness of the theatre proper is mainly confined to the proscenium arch, which is ornamented with gold and colour, strong lines of blue being introduced in the upper part, and on the spandrels of the double row of circular panels. The space immediately above the proscenium opening is occupied by a large figure subject gilded, while the opening itself is lined with grand antique, cippolino, and Italian Pavonazza, some panels of Mexican onyx being introduced at the side. The roof of the auditorium, which for acoustic reasons has been made to rake upwards from the proscenium, has a rich treatment of figures and arabesques, the cooler tones being somewhat sharply contrasted with the deep blue ground of some of the panels and the dark red radiating and outer lines of the octagon, in which form this central feature has been designed. The walls of the auditorium itself are treated in a pale green gradually strengthening in tone towards the bottom, the balcony fronts in every case being of a similar tint, but picked out with gold, with cupids at intervals holding the electric lights. There is also some very delicate hand-painted work on the columns of the boxes, which are upholstered in yellow. The best general view of the interior is undoubtedly from the middle of the dress circle, besides being, as in fact it generally is, the most advantageous portion of the house for seeing and hearing the performance.

ON the 4th inst. Mr. Horatio Daniell read a paper before the Civil and Mechanical Engineers' Society, at Westminster, on the Jerome steamship shaft, which is composed of steel wires of small diameter, bound together in such a manner as to give them sufficient strength to resist both bending and torsional stresses. A shaft of this description is claimed to possess many advantages over the ordinary solid shaft now in use, it being not only less expensive, but, for the same weight of material, considerably stronger. In building up such a shaft, say 15 in. diameter, it would be constructed in lengths of 20 ft., the ends of each section having couplings attached for connecting them together. Collars for bearings would be fixed between the couplings where required. Each length would consist of some 5,000 wires, and could be formed of "seven bunches of wires of 5 in. diameter, one 5 in. bunch in the centre as a core, and surrounded by six similar bunches, the whole making the larger 15-in. section." It is proposed to weld the wires together which form one of these bunches, and at the end of each section the seven bunches would be welded into a solid end. The tensional strength of each wire used would be 1,500 lb., and Mr. Daniell points out that, as it is possible to actually test each wire separately, much greater reliance can be placed in a shaft thus tested than on an ordinary solid one, in which it is often very difficult to discover if a flaw exists. Very considerable bending stresses are liable to occur in a steamship shaft, due to the straining of the hull, causing the bearings of the shaft to be no longer in a truly straight line, as well as from the unequal resistance the propeller meets with in rough weather, due to the pitching of the ship, and a shaft, having only a portion of the improvements claimed for the one under consideration, would be most valuable. There are, however, in our opinion, many practical difficulties to be overcome in the construction of wire shafts for steamships, and it is impossible to say, without making experiments on a large scale, whether they are destined to supersede those now in use.

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THE continued excavations which are made for the construction of new buildings in the centre of Florence have brought to light many important ruins of edifices of the Roman epoch, which belong to the monuments which adorned the ancient Forum and the Capitolium. Just recently, under the Mediæval palace Della Luna, walls of about 3 mètres in thickness have been discovered, supposed to have belonged to the Temple of Jupiter, which, in imitation of Rome, was built also in the Capitolium of Florence, and the memory of which has been preserved until the present day in the denomination of the church of S. Maria "in Campidoglio." Besides the above-mentioned walls, fragments of mosaic, and sculptures in marble and stone, were found. On the site of the church, now demolished, of S. Donato dei Vecchietti, have been recognised traces of remains of ancient baths. In Via Calimara, at the depth of 3·80 mètres below the modern level, has been found a base of Luni marble, with cornices on three sides, ·37 mètres high, ·32m. wide, and of ·22m., which bears in front, in characters of the first or second Christian century, a mutilated inscription, in which can be read the words, "Genio Coloniae Florentiae." In the upper part are to be seen the holes for the cramps to hold the statue. Already, by other inscriptions, it was known that Florence had been a Roman colony, but the confirmation now given by the new discovery is worthy of remark. The works of the new locality, which will soon become the Museum of the Opera del Duomo, are almost terminated. In the large gallery has been already placed all the architectural and decorative work and bas-reliefs of Lucca della Robbia and Donatello, which ornamented the ancient pulpits of the Florentine Cathedral, which sculptures were formerly in the National Museum. In the new Museum various other objects belonging to the Opera del Duomo will be carefully exposed, terra-cotta, arms, capitals, and other architectural fragments, and a great many Mediæval ecclesiastical objects of artistic value, among them, above all, the celebrated altar, of massive silver, of St. John the Baptist, and which in past times, for only eight days in the year, was exposed in the Florentine baptistery. The director of the works of the new Museum is the Prof. Arch. Sig. Luigi del Moro.

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WE have received from Mr. F. Massie, the Engineer, Surveyor, and Waterworks Manager to the Wakefield Union Rural Sanitary Authority, a copy of his annual report, which tends to show that, unlike some Rural Sanitary Authorities which we have occasion now and then to refer to, the Wakefield Union is in earnest in endeavouring to improve the drainage and water-supply of the district within its area. The report records a scheme for water-supply to the townships of Crofton and Walton, for which borrowing powers have already been granted, and one for another district for which similar powers have been asked for; seven or eight new drainage schemes for different districts are under consideration, or already in progress; and the surveyor urges that, as he had found on entering on his duties that there was considerable laxity as to complying with the by-laws in the submittal of plans, &c., the existing by-laws should be made uniform throughout the district, printed forms of the requirements prepared, and compliance with them enforced. Altogether, as far as the report affords evidence, we may congratulate the Wakefield Union Authority on their activity in the right path and on the efficiency and zeal of their surveyor.

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THE exhibition of Miss Kate Greenaway's drawings at the Society of Fine Arts leads to the conclusion that a good deal of their charm arises from their delicate colour harmony, combined with the old-fashioned naïvete of style and costume which distinguishes them. Seeing a number of them together one cannot but recognise that there is a sameness about them, as well as a certain stiffness of drawing in many cases. In fact some of them, such as "Puss in the Corner" (121) represent types of children as conventional and as unlike real children as some of those in Blake's "Songs of Innocence." Others, such as "Girl with Baby" (126, from "A Day in a Child's Life") have more every-day and human interest and expression. In a decorative sense the whole series is charming. One or two larger water-colour drawings, such as "Far-away Thoughts" (158), show that the artist has higher powers than are expended in the production of her children's picture-book series, when she chooses to exercise them. Mr. Hugh Thompson's series of pen and ink illustrations to the Vicar of Wakefield, in the same room, exhibit a remarkable degree of humour and perception of character, though we think that, in this and other works of the same class, the artist, in his desire to revive a realistic representation of the middle and lower classes of a century back has exaggerated the vulgarity and coarseness of his types of farmers and squires and farmers' men, &c. His conception of the vicar is excellent, however.

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THE HARLEIAN SOCIETY.—The annual meeting of the members of this Society was held at 140, Wardour-street, W., on the 4th inst., Mr. G. E. Cokayne, Norroy King of Arms, in the chair. The accounts of the Society showed a marked increase in the interest taken in genealogical pursuits, to which the Society's publications are devoted, and its prosperity was considered in every way satisfactory. The publications issued during the past year were the "Marriage Licences issued by the Vicar-General of the Archbishop of Canterbury, 1679—1694," in two volumes; and the "Registers of St. George's Chapel, Mayfair, 1740—1754." "The Visitations of Norfolk," and "The Register of the Parish Church of Kensington," are now in the press, and other volumes are in preparation.

## BYZANTINE ARCHITECTURE.*

BY PROFESSOR AITCHISON.

*Neo-Byzantine.*

THE buildings of Justinian's days must be looked on as the culminating point of the Byzantine style, and the most magnificent memorials of his reign; for I do not know of what value his code, pandects, and institutes are in the present day, but law students have to be examined in them.

Many circumstances contributed to this. We suppose he had the advantage of the architects brought up in the schools founded by Constantine, and of the skill which had accrued to architects by the number of public buildings erected at Constantinople; for when Byzantine became the capital of the empire there was not only Constantine's palace to build, but the public offices, places of amusement, and palaces of the Senators, and, in consequence of the empire having become Christian, innumerable churches and monasteries. It is possible that much of the splendid materials stripped from every province of the empire by Constantine had not been used up; Justinian inherited thirteen millions from his predecessor; the arms of his generals had been successful, so he had the revenues of a good part of the old Roman Empire at his disposal,—every temple had been plundered and its revenues sequestered, and every act of extortion was used to fill his treasury. Had it not been for his cowardice and foolishness in constantly paying heavy subsidies to the barbarians, which drained his coffers, and served only to invite fresh inroads, the expenditure on his buildings would have scarcely been felt, for they were a perennial source of income, as they still are, to the Turkish Empire.

After his time, every sort of disaster fell upon the Empire, the West was permanently wrested from it, and the constantly-increasing conquests of the Moslem were diminishing its extent, both in the East and in the West. Whatever merits subsequent buildings may have, nothing equal to Sta. Sophia is to be found. The Church of the Sti. Apostoli at Constantinople was built by Constantine, rebuilt by Justinian, and ultimately destroyed by Mohamed the Second for his own mosque. In Procopius, there are passages which may lead us to believe that neither the drum nor the Latin Cross were after inventions, and, if this be true, we can hardly take either feature as a proof of Neo-Byzantine.

Procopius says (Procopius, Lib. 1, cap. 4):—"In ancient times there was one church at Byzantium dedicated to all the Apostles, but through length of time it had become ruinous, and seemed not likely to stand much longer. Justinian took this entirely down, and was careful not only to rebuild it, but to render it more admirable, both in size and beauty; he carried out his intention in the following manner. Two lines were drawn in the form of a cross, joining one another in the middle, the upright one pointing to the rising and setting sun, and the other cross line towards the north and the south wind. These were surrounded by a circuit of walls, and within by columns placed both above and below; at the crossing of the two straight lines, that is, about the middle point of them, there is a place set apart, which may not be entered except by the priests, and which is, consequently, termed the sanctuary. The transepts which lie on each side of this, about the cross line, are of equal length; but that part of the upright line towards the setting sun is built so much longer than the other part as to form the figure of the cross. That part of the roof which is above the sanctuary is constructed like the middle part of the Church of Sophia, except that it yields to it in size; for the four arches are suspended, and connected with one another in the same fashion, *the circular building standing above them is pierced with windows*, and the spherical dome which overarches it seems to be suspended in the air, and not to stand upon a firm base, although it is perfectly secure.

In this manner the middle part of the roof is built: now, the roof over the four limbs of the church is constructed of the same size as that which I have described over the middle, with this one exception, that the wall underneath the spherical part is not pierced with windows. When he had completed the building of this

* Being the Third Royal Academy Lecture on Architecture this season. Delivered on Monday evening, February 2, 1891. (For the First and Second Lectures see pp. 82 and 103, *ante*.)

sanctuary, the Apostles made it evident to all that they were pleased and thoroughly delighted with the honour paid them by the Emperor." ("Procopius," Lib I., cap. 4.) In this church Constantine and many of his successors were buried. Ducange says, "All the Christian Emperors."

I wish I could give you characteristic specimens of churches from the days of Justinian to the end of the Byzantine Empire, arranged according to date, so that I could point out the tendencies that culminated in Neo-Byzantine, and follow them consecutively to the end, but there are no accurately-published data to go upon. We have the school at Athens pursuing this subject, and several of our English antiquaries are devoting themselves to it. I may mention Professor Hayter Lewis, the Rev. Canon Curtis, and Dr. Freshfield, and it is probable that many other English antiquaries are doing the same, as well as those of France, Germany, Russia, and Greece. Whenever a sufficient number of examples are accurately drawn, and all the requisite information has been got from books and MSS., we shall be able to classify the churches and other buildings according to their centuries, just as we now can Gothic buildings. The dates of many Roman buildings have been ascertained from the stamps on the bricks, which shew us at least that the buildings were not erected before the Emperor's accession in which the bricks were made.

In every style that was once alive, and that was not ossified by religious conservatism, there must have been in almost every building some peculiarity of plan, construction, or adornment at each successive period that, if sufficiently studied, would reveal to us its approximate date; but these indications must be studied with due regard to local peculiarities, and to the architectural schools that have produced them.

At present we must, to a great extent, be content with guesswork, and an important and interesting chapter of architectural history must have most of its pages left blank. Tracing the differences in plan, construction, and æsthetic treatment, of a long chronological succession of buildings of the same style, is attractive enough, and marking the various internal and external causes of variation is profoundly interesting, but without proper data it can only lead to false theories. In this case the influence of Byzantine architecture on Saracenic, Romanesque, Russian, and Gothic architecture has been very great—in fact, we may say that up to a certain period Saracenic is Byzantine; so there is all the more reason to encourage architects and antiquaries in their efforts to complete the subject and to solve the problems. The reasons for this neglect are not far to seek: the style itself was till lately looked upon with contempt. Huge gaps have been made in the sequence of buildings by their destruction. The rise of Saracenic architecture did, in some cases, alter the forms of existing buildings, and before and since that epoch successive alterations and rebuildings have left us uncertain as to what is original, what was produced as a colourable copy of the old, and what was entirely new; while the loss of records, the changes of name, and their re-dedication by the Mussulmans have rendered it difficult or impossible to identify them. Almost insuperable difficulties existed, and to some extent still exist, in obtaining the requisite knowledge of the subject; many examples are in parts not easy to get at, and when got at the country certainly *was* in so lawless a condition, that nothing could be done; violent Moslem fanaticism not only prevented the delineation of buildings, but even prevented their interiors from being seen, and some fanaticism in that direction does even now exist. Ware, in his book on vaults, published in 1822, tells us, in a humorous way, that if you want to get the particulars of Sta. Sophia you must turn Mussulman. It requires a good Greek scholar to get some of the facts required from ancient writings, for I believe many of the Byzantine authors and MSS. are not translated; to follow it up locally you want to be a master of modern Greek and Turkish at least; besides, to many persons Byzantine history is not attractive, for, with some notable exceptions, it is the record of turbulent, cowardly, and venal slaves, and of astute or worthless despots or their creatures, as destitute of courage as of humanity, playing savages against one another, while the most desperate maxims of Machiavelli were daily put into practice. Shakespeare's play of "Titus Andronicus" will give you some idea of the Byzantine Court. It is one of the episodes of history in which hypocrisy, ingratitude, treachery, cowardice, corruption, and bestial vice is pourtrayed in blood, and accompanied by the groans of an oppressed people and the shrieks of the tortured.

Comparatively little has been published on Byzantine architecture, considering the vast areas over which it extended, and the length of time it endured; we have, however, the magnificent work of Salzenberg on Sta. Sophia, on five other churches at Constantinople, and on three in Asia, but, unfortunately, the text is in German; if some German scholar would publish the text in English, it would be a great boon to the profession.

Couchard published a book on some of the Byzantine churches in Greece, and Labarte on the Imperial Palace at Constantinople, Paspati on Constantinople, Texier and Pullan on Byzantine architecture, mainly on the churches at Salonica and Trebizond; Texier on Persia and Armenia, Verneilh on Byzantine architecture in France; there is also a magnificent work on St. Mark's, published by Onigania; the Marquis de Vogüe on Central Syria, Mr. A. J. Butler on the ancient Coptic churches of Egypt, and M. Choisy's great work on the art of building amongst the Byzantines, and within the last few years a new edition of an interesting little book by M. C. Bayet has been published on Byzantine art; but there are many examples contained in works on other subjects; in Hubsch, for example, on "Christian Architecture from Constantine to Charlemagne," in Isabelle's "Round Buildings and Domes," and in Mr. T. G. Jackson's "Dalmatia," but I know of no comprehensive work on the Byzantine churches of Greece, Asia Minor, Armenia, Mesopotamia, and North Africa.

I personally feel towards the writers on Byzantine Architecture as Constantine did towards the bishops, he was ready to throw his cloak over their frailties; so I will only say that you must not be too sure that what is published is correct.

I do not know whether I made it clear that the buildings erected in Constantine's days were purely Roman, saving some little peculiarities that may have been introduced by the foreign architects and workmen, that the shape of the churches with the exception of a few circular and polygonal ones was that of the Roman Basilica. During the time that elapsed between Constantine and Justinian, the Christian church had been trying to settle the most convenient form for its ritual, and this form appears to have been pretty well agreed on by Justinian's time; the Basilica seems mostly to have been given up, and the Eastern church had more or less settled on a square for its nave, and on a dome for its covering, but the churches were often lengthened not only by the Bema, but by other spaces to the East and West, so that in these cases they did not differ very materially in their proportions from a Basilica. When Byzantine architects had fitted a dome to a square by means of spherical pendentives, this dome and these pendentives had to be abutted, and this was done by means of other domes, half domes, or wide barrel vaults. The Church of St. Irene, built in Constantine's days, as an appendix to Sta. Sophia, was doubtless a basilica of the common form like Eski Djouma and St. Demetrius at Salonica, or St. John's studios at Constantinople. Ducange says it was a triple church, dedicated to the Virgin, to St. Theodora, not the Empress, I presume, and to St. Irene; after the fire in Justinian's days it was rebuilt, and afterwards Ducange says it was shaken by an earthquake in the days of Leo III., the Isaurian (717-741); it is now a Turkish armoury, and, although I used what influence I had, I was unable to get into it. The present building was probably of Leo the Isaurian's time (717-741), for we see that a new system has been adopted to keep the old basilica form, and to dome it; three pairs of piers were used after the manner of those at St. Demetrius at Salonica, but bigger and arched over to other piers in the external wall. The columns had been replaced by the piers of an arcade, and over the centre of the nave was a dome about 46 ft. in diameter, abutted westwards by an oval dome, eastward by a barrel vault, and the half dome of the apse, north and south by barrel vaults. The central dome has a tall drum, pierced with twenty windows, below the dome, thus forming a lantern. From the days of Constantine to those of Justinian, the dome windows, in the churches that are left, were mostly in the dome itself; and the drum is one, perhaps the chief, sign of the Neo-Byzantine, always supposing that the Sti. Apostoli had no drum. If S. Irene was still dedicated to the three saints, it had no apses to the aisles, probably following the form of the original basilica. The nave, from the face of the narthex to the end of the apse, is three times the diameter of the central dome, whilst Sta. Sophia at Constantinople, is only two and a half times. I may as well take Sta. Sophia of Salonica, or Salonicco as it is now written, as my next example. This is the church that suffered in the late fire, and is of course now a mosque. It was empty, and mosques have been traditional places of security and of refuge. The unfortunate people who were burnt out in a section of the town adjoining it, carried all their spare clothes, carpets, deeds, valuables, and small articles of furniture, into the mosque, which was separated by its garden and by a street from the fire; the wind was high and the mosque windowless; the sparks and embers flying in set fire to the combustible things stowed there. The flames ignited the wooden roofs of the portico, and of the upper galleries, which were all destroyed, and the deeds of the Mosque as well. Some of the Verd antique columns of the nave were shattered (a piece that scaled off one of the nave columns is exhibited) and the leaves of some of the white marble capitals on the opposite side were calcined; some of these capitals have their leaves represented as bent by the wind, an idea that excited Mr. Ruskin's enthusiasm when he saw those at St. Mark's, though this form of enrichment seems to have been a stock pattern; still the sculptor who originally observed this effect of the wind on leaves, aud was able to represent it in so architectural a way, deserves all the praise that can be bestowed on him; later civilised ages can always refine if they cannot invent. The brickwork appears to have suffered no damage, though in many places the plaster was brought off, so this Mosque may give us a lesson of the advantages of using burnt brick for public monuments.

Texier and Pullan supposed that this cathedral was of the time of Justinian, and was built by Anthemius; but I believe it was of later date, for it has three apses at the east end, a short drum to the dome, and the north and south arcades are set back, so as to get a wide barrel vault to abut the dome. If it were designed by Anthemius, we may reasonably suppose it was so designed before Sta. Sophia at Constantinople, for the following reasons. We can hardly believe that Justinian, who was so anxious to get Sta. Sophia done, that he had a room built to see the progress of the work, would have spared Anthemius, and Anthemius is said to have died in the second year after the great Sta. Sophia was begun, viz., in 534, yet it could not have been built before, for the extra abutment to the dome was to correct the weakness discovered at Sta. Sophia.

The drum is a square one, pierced with three windows on each side below the springing of the dome

When Sta. Sophia at Constantinople had once been built, it was naturally taken as a model for other large churches or cathedrals. All the principal mosques at Constantinople built by the Turks are from the model of Sta. Sophia,—with modifications, of course. Sta. Sophia at Salonica is a striking cathedral inside. It looks vast as compared with most of the other churches there, with the exception of St. George, and this scarcely has the look of a Christian church, but when I saw it I had not seen the original, nor the great Turkish mosques. The idea is a fine one, if not carried out on too small a scale. This church is now merely whitewashed, so there is nothing but the conception to captivate you,—there is nothing to be set down to the impression produced by gorgeous decoration; so you may bear in mind that a grand idea properly carried out produces a grand effect. Externally it has a Turkish porch extending across its front, and inside a narthex, rather over 18 ft. wide and 104 ft. long. The aisles are about 18 ft. wide and 86 ft. long, and must, I suppose, have been separated from the narthex by curtains. The length of the nave from the narthex to the end of the apse is 105 ft., and its width is only 33 ft., but it has two square recesses at the sides of the dome, making it there 56 ft., while the nave at Sta. Sophia at Constantinople is 265 ft. long by 110 ft. wide. You see, by comparing the plans, that it is without the two

grand hemicycles, that the bema is much deeper, that the screen walls are carried back instead of being in line with the face of the dome piers, and you also see the two chapels or vestries on either side of the bema have an apse to each. Above, the gallery goes over the narthex as well as the aisles, as at the great Sta. Sophia. At one time this cathedral was sumptuous with marble linings and mosaic, but the marble linings have disappeared, and the mosaic is now obscured by whitewash and by the smoke from the fire. The fire has also revealed an undercoat of plastering in the narthex and aisles on which the remnants of frescoed figures and ornament are to be seen. The cathedral externally has a more architectural appearance than the great Sta. Sophia. The Turkish portico, consisting of an arcade of nine columns, has doubtless been a great improvement to its appearance; above this is a narrow strip of wall, the front of the gallery over the narthex, with twelve small round-headed windows in it, two of which are blanks. These small windows give a scale to the building, and make it look larger than it is; above them is a still narrower strip of wall, with one window in the middle. The drum of the dome is square, and is pierced by three large round-headed windows, which give light to the windows of the internal circular drum. Above this is a strip of the circular dome, covered with lead, and from this to the square wall below are flying buttresses; above, there is the segmental cap of the dome, covered with lead. The Turks have improved the appearance of the dome by the addition of a little dome-shaped piece, from the centre of which springs a finial.

In small churches there was an inclination to make the central dome stand on four monolithic marble columns, as may be seen at St. Bardias, at Salonica. It is called so in Texier and Pullan, but was dedicated to the Virgin in the year 1028 by Christopher Bardias and his wife and family. It has the three apses, and an octagonal drum to the central dome, with windows in it of two tiers; but in this case the dome is not seen externally, the drum or central tower has a hipped roof, it has two later domes over the gallery above the narthex. St. Elias, at Salonica, has a peculiar plan; it is trefoil with a straight end,—the three foils form the bema and the two transepts; it is without aisles, but has two tiny chapels with apses in the huge piers of the bema, and a large narthex and gallery over. The narthex is vaulted on four columns. It is about 25 ft. by 31 ft. inside. From the appearance of the church I should judge it to be late.

I will just mention the Church of the Monastery in the Country at Constantinople (*Μονή τῆς Χώρας*), because Ducange says the original church was built by Justinian. The Rev. Canon Curtis says it was built before Constantine's time, *i.e.*, over the bodies of St. Babylus and two other martyrs, who suffered under Decius in 250; and Fergusson believes that its front gave the idea of the front of St. Mark's at Venice; though, for the matter of that, many Byzantine churches have similar features,—one side of St. Bardias, for example.

The present church was either rebuilt or restored in the reign of Andronicus Palæolagus the elder (1283–1295). It now consists of the central church with another adjoining it on the north side, and a two-storied building on the south, and is celebrated for the beauty of its decoration. The narthex and exonarthex have the remains of some of the most beautiful mosaics that remain to us. The north church has been adorned with figure-painting in fresco; the central church has its walls encrusted with lovely marbles, pietra dura, and geometrical mosaic in gold and colours. It is adorned with some of the most beautiful acanthus work carved in white marble I have ever seen; in it was kept the portrait of the Virgin, attributed to St. Luke. I believe the marble doors, a drawing of which is exhibited, once covered this portrait. A robe of the Virgin, which was carried in procession round the walls of the city when it was threatened, was alternately kept in this church and the Hodegetria. A sketch-plan of the church, to a small scale, partly from memory, is exhibited, as the mollah objected to my taking a plan.

From Justinian's day there seems to have been a strongly-marked inclination to arrange churches on the following plan:—A square was set out as big as you could afford to build your central dome, with columns or piers at the angles; from the centre of this square half circles were turned, and the extremities of these formed the external lines of the aisles and of the east and west arms of the cross; to the east there was a deep space beyond, with the apse at the end forming the bema; the four squares formed by the aisles, and the two similar passages crossing east and west, round the square of the central dome, were ceiled with small domes level with the other vaulting. The aisles were carried as far as the square part of the bema, and then had an apse to each, generally projecting externally. A narthex was added at the west end, or a narthex and exonarthex. As time went on, these subsidiary little domes were carried up on drums to group with the central dome, and the narthex also sprouted into domes. This plan seemed to take the fancy of the Westerns as well, for I found that St. Mary-in-the-Fields, at Piacenza, built in Renaissance days, was a complete example of this method, only the central dome was veiled externally by square erections; the four little domes had drums, and showed externally.

When more room was wanted in the church than the spaces I have described, another bay was added at the west, or two additional aisles, or four chapels were put outside the first aisles. The arrangement before mentioned, occasionally with slight modifications, may be seen at St. Theodore, the Pantocrator, the Theotocos at Constantinople, and at St. Bardias, at Thessalonica; Sta. Sophia, at Trebizond, is an imperfect specimen; at the old Cathedral, St. Theodore, and the Kapnikarea, at Athens.

In the case of St. Nicodemus at Athens, at the church of the Monastery at Daphne, near the Bay of Eleusis, and at St. Nicholas at Mistra in the Morea, the central domes come up to the bema, the arms of the cross are made much narrower than the diameter of the dome, and there are additional aisles or chapels on both sides; the two first of these churches have squinches or conchs instead of pendentives. St. Mark's at Venice is somewhat after the fashion of Procopius' description of the Sti. Apostoli at Constantinople, only St. Mark's is said to have been built in 1043, in the reign of Constantine the Tenth (Monomachus, Finlay calls him, the Ninth), and covered in 1071, in the reign of Romanus, Michael the Seventh, or Nicephorus. The domes at St. Mark's are pierced with windows in the dome itself, as at Sta. Sophia.*

The plan of St. Front at Perigueux is very like that of St. Mark's,—so like, that if one were not a copy of the other, they were taken from a common model,—possibly the Sti. Apostoli at Constantinople. However, the construction of the two is absolutely different: that of St. Mark's is pure Byzantine, brick veneered with marble, or covered with mosaic; St. Front is of worked stone,—walls, pendentives, cupolas, and all. It is extremely unlikely that if Byzantines built St. Mark's, that they were also masters of stone-cutting, and they must have been to execute St. Front, unless we suppose they merely gave the plans and sections, and left the French architect or master-mason to construct it in his own fashion, for the stonework does not look like Byzantine work. There have been bitter controversies on the question of who designed and who carried out St. Front, and as I have no fresh materials to bring that might settle the controversy, I will leave it as it is; I may, however, say that there are a few small windows in the domes of St. Front. De Verneilh has published a book and a pamphlet on this subject.

The old cathedral at Athens† is curious for many reasons; it is a very small church, only 24 ft. 2 in. wide over all, and 37 ft. 6 in. long, exclusive of the central apse, which projects about 3 ft. more; it has a narthex about 6 ft. 8in. wide, whose length is the whole width of the church. The church has three apses, and a central dome on a drum, and the internal cross is made by the four barrel vaults surrounding the dome. The nave is only 8 ft. 2 in. wide, and the bema and parabemata are cut off from the nave by the iconostasis. Outside, the cross is brought forward over the narthex, and over the bema to the front and back walls. The drawings exhibited, made by Messrs. Schultz and Barnsley, have been lent me by the school.

The cathedral shows on its face some attempts at elegance; it was evidently built during or after some occupation of Athens by barbarians, for it has barbaric carvings on it, and it has also a family resemblance to the churches in Armenia. It now stands in an open square, with its main front towards the street. It is built of large stones, with a brick course between each one of stone; its front has a dentil cornice with a carved frieze, which looks like a bas-relief, on which crosses have been worked or let into, and with a necking; at each end of the cornice is a Classic pilaster cap. In the centre and immediately under the frieze is a moulded marble arch forming a discharging arch over the lintel of the door; a moulding runs up vertically from the bottom of the ends of the archivolt, forming plain marble spandrels, and the arch itself is filled in with a carved slab with a cross in the centre; the top of the lintel is moulded, and this moulding runs across the front of the church; the lintel below is carved with pateræ, and two lions facing a cross in the middle; the door below has two plain marble jambs, which go down to the step, and there are no windows in the front below the cornice; between the necking of the frieze and the moulding on the lintel are three carved slabs on each side of the door-head, roughly symmetrical; in the centre above the cornice is the gable end of the upper roof, forming one arm of the internal cross; this gable has a two-light window in the centre, and the rest is filled up with carved panels; the north flank has a doorway in the middle, slightly projecting, and a window between it and the west end. The cornice runs through, and is stopped by the doorway, and over the doorway is another arm of the cross that gables, and this end of the cross above the roof has also a double window in the middle. A sort of half pediment is made between the west end and the gable end of the external cross by the flank wall of the lean-to roof, and carved panels are let into this side wall. The back or east end is finished with a pediment, from the middle of which rises a vertical and central straight piece, also gabled; against this the roof of the semi-octagon of the bema abuts; below, in the end of the semi-octagon, is a two-light window, and there are two other small arched windows, being those of the other two apses, which in this case do not project. The upper part of the east end is covered with carved slabs. The south flank has a line of carved slabs and one window, a doorway with an arch over, and the lower part was once painted in fresco; at the west end of this side there is the half-pediment, like the one on the north side, and the fourth arm of the cross with a two-light window in it. From the middle of the church an octagon drum rises from a square base with long circular-headed windows, whose semi-circular archivolts cut into the dome: the dome is tiled, and has a cross for a finial. The carved marble slabs inserted in the external walls are of all ages, and the carving ranges from pure Classic to pure Barbaric, and they are placed according to their form, but quite irrespective of the ornament on them. Some are upside down, and some horizontal bas-reliefs are put vertical. One panel of barbaric carving represents a hare in the claws of an eagle. Another a wild beast, possibly a cheetah or a lion, seizing a fawn. It is an episode likely to strike a pastoral or hunting people. It is repeatedly used as a simile in the "Arabian Nights," though the lamb often takes the place of the fawn, and this or a cognate subject is of remote antiquity. In the Odyssey we read that:—"Goodly Odysseus wore a thick purple mantle, two-fold, which had a brooch fashioned in gold, with a double covering for the pins, and on the face of it was a curious device: a hound in his fore-paws held a dappled fawn, and gazed on it as it writhed." (Lib. 19, Butcher and Lang.) This device is still used in the East; you may often see it carved on the blades of Indian swords or daggers, just below the hilt.

Whenever we see the hideous octagonal drums with their window archivolts cutting into the external dome, I think we shall be right in attributing them to a late date.

It is not easy to see how the external walls of churches are built at Constantinople, as they have been so repeatedly whitewashed, but I believe the plan was the same as that pursued at Athens; each course of the stonework had one or more courses of brickwork between it and the next, and the Byzantines mostly used thick mortar joints, as thick or thicker than the brick, but in addition to the horizontal courses the bricks were used in the same manner in the vertical joints, and in some

* See lithograph in the present number, showing the section of St. Mark's.

† For an illustration of this building, see the *Builder* for November 30, 1889.

cases the stones appear to have been kept short, and the spaces between these ends are filled with mortar, and with the bricks in the vertical joints cut in imitation of Cufic characters: at St. Nicodemus at Athens there is a plastered string, ornamented with this work, each bit of Cufic writing being separated by a star in brick; ordinary strings when not of marble are made by setting the bricks diagonally between two courses, flush with the wall, the points of the dog-tooth come out flush with the horizontal courses. For eaves the diagonal bricks project. At the Sti. Apostoli, at Salonica, there are patterns formed on the walls with bricks laid zigzag, horizontally, and by vertical interlacing zigzags. Windows have single, double, and triple lights. In each case, the arch generally consists of two rings, the mortar joints being thicker than the bricks. These arches are capped by circular or segmental archivolts, with zigzag bricks in them, and two-light windows often have a brick star in the spandrel between the two arches. The mullion is usually a marble slab, about 3 in. to 4 in. thick, with both ends forming a quirked bead in section, or a half octagon or hexagon. The top is finished with a cap, sometimes with a rosette under it, and sometimes with a rosette only. These little attached columns sometimes have splayed bases, and sometimes none. The arch, which is usually stilted, is carried on a cube of marble supported on the mullion; this cap is slightly splayed on the two sides, and deeply splayed at the ends. The end splays are sometimes plain, but more often carved. Sometimes the ends only project a trifle before the arch, and sometimes to the whole extent of the end splay, suggesting that a regular length was kept in stock. At the Church of the Monastery in the Country at Constantinople the mullions are of slate or dark grey marble, and only look about 2 in. thick, have square ends, and are ornamented with sunk lines at top and bottom, and with the usual cap on the top. Roofs are mostly covered with tiles, the water tiles being segmental in section, and the covers half-round. At the eaves two dabs of mortar are put in the spaces between the segmental tiles and the roof, and another dab into the hollow of the half-round one, forming a line of rude antifixæ. These devices might be adopted for cheap brick cottages or churches in the country; it is a sort of bricklayers' art. At Athens the churches are mostly minute in size; at some of them I could almost touch the sides of the nave with my outstretched arms. But at present we only see churches that are on a small scale, the great Byzantine churches of Athens were Sta Sophia, afterwards the Church of the Virgin, St. Nicholas, and St. George. I may here say that Gibbon appears to have been mistaken in confounding our patron saint with the fraudulent pork butcher of Cappadocia; these churches are better known as the Parthenon, the Erectheum, and the Theseum. On the marble walls of the Parthenon the remains of pictures of Byzantine saints and ornament still remain, and in the Theseum the Byzantine vaults of St. Nicholas still exist. The little Greek churches are curious from an archæological point of view, and are as superior in practical science to ancient Greek construction, as they are inferior to it in every æsthetic quality. Besides the stately ruins of the Acropolis, where exquisite architectural simplicity has been carried to the highest point man has yet attained, where no touch of the chisel has been given except to an artistic end, and not one in vain, where the greatest sculptors have adorned the building with the most perfect specimens of the human form, and with masterpieces of composition, we scarcely bestow a glance upon one of the little Byzantine churches beside them. Still they have their use in illustrating the history of architecture and of humanity. What we should look for, and what we shall certainly find in them, is the science with which domes are poised and the ingenuity displayed in new arrangements of plan without diverging in the main from the established type. Almost all Byzantine churches are domed; for internal effect you want the dome to rise immediately from its pendentives or squinches, so that it may form part of the general effect, when it is on a high drum you see nothing but a light space until you get under it, and then your attention is confined to the drum and dome. It is like an episode in writing, it may have what merits you please, but it interferes with the continuity of the main subject. The use of drums may, however, be looked on as a benevolent invention, when the drums and domes are not too ugly, for many more see the outside than the inside of a building.

I think that anything in architecture which merely causes surprise, reduces the architecture that employs it to a secondary level, still in that level it may be considered praiseworthy. The small internal domes, on pierced drums, have a startling effect; you look down a long aisle or narthex without windows, and see patches of bright light, and when you arrive at one of these patches and look up, you seem as if you were looking up from the bottom of a fluted well, for most of them are fluted and pierced with sufficient windows to make them seem all light in a sunny clime.

Thanks to Mr. Falkener, we have the drawings of St. Clement's at Ancyra, in Galatia, given in Fergusson's "History of Architecture;" in one respect it resembles St. Theodore, at Constantinople; the apses of the aisles are continued round so as to make circular halls; it has also a short drum to the central dome, with four windows, but the bottom of the dome itself is pierced with many windows, as at the great Sta Sophia. Were it not that St. Mark's at Venice, built in the eleventh century, has the same features, we should assign St. Clement's to an early date. We want illustrations of many more churches from Asia Minor, and more dates, before we can venture to assign the period of construction from peculiar features. I will just mention the churches in Armenia, because they have a strong resemblance to those in Athens, though rather superior to them in style, with domes of Persian shape.

The church at Dighour, in the the neighbourhood of Ani, has a plan of the regular orthodox type, a central dome on four large square piers, forming a Greek cross by means of four barrel vaults on the four sides of the dome, with an apsidal bema to the east, very narrow aisles, and no narthex; at the east end of the aisles are two oblong chambers, and from there being two small apses north and south at the east end beyond the walls, and in the open air, it has the appearance of having had a lean-to roof, or a small colonnade outside; at Usurlar these outer colonnades or arcades still exist, but the east ends of the aisles and outer arcades are square, though the bema is apsidal. Externally, the church has a strong resemblance to some of the buildings in Central Syria, the lateral sides of the cross are shown by projections above the roof gabling as at Athens, and though the east and west arms are merely indicated by a slight vertical break in the main gable, this upper part is gabled too. One of the most curious features in the church at Dighour, is the occurrence of six buttresses with off-sets and water-tables at the west end.

In a course of lectures it is impossible to give examples from every country where Byzantine Architecture prevailed, but I may say that the ancient Coptic churches of Egypt are very curious: they all appear to have a central apse, a few only have the three, and half the dome is over the bema, *i.e.*, the walls of the apse form the spring for it: these Coptic churches are curiously divided by screens, and what looks like a narthex has a tank in the middle.

Mr. W. Boutcher, who was engaged on the Assyrian discoveries, has been amiable enough to entrust me with his sketches of the church of Mar-Yakoob (Bishop James), at Nisibis, made in the year 1855. I believe no plan or description of this church has ever been published. The town of Nisibis is situated on the plain at the foot of one of the spurs of the Mount Masius, and was the key to the Valley of Mygdonia, from which Mesopotamia was mostly entered by the Persians; it had successfully resisted two attacks of Sapor II., the Persian King, and on the third attack Bishop James urged on his townsmen the necessity of resistance. Sapor had to raise the seige on account of an incursion of the Massagetæ. Nisibis was ultimately conceded to Sapor by Emperor Jovian, in the disastrous treaty made immediately after the death of Julian in his Persian campaign.

The church was in 1855 a double one, but there was a tradition that it once was triple, the domed one with the narthex being the middle one; each of the two remaining churches has an apse at the east end, the shorter one has a flat apse at the west end as well, with a semicircular niche in it. In the larger church there remained one aisle going up close to the apse, and suggesting that there had been another aisle; but there was also a tradition that this was a subsequent addition to support the vault; this church was vaulted with a pointed vault. The recesses at the ends of the aisles, in a line with the springing of the apse, are square. An empty sarcophagus with a cross on it was found in a vault 14 ft. by 8 ft. under the church, and was supposed to be that of the Bishop. By some the centre church is believed to have been a mausoleum to the Bishop.

Mr. A. Graham has been kind enough to lend me one of his drawings of the Basilica at Theveste (Tebessa), the last Roman town in North Africa, being about 100 miles west of Thapsus, and at the same distance from the north shore. The old Roman Basilica, tinted in red, lay north and south; the Byzantine additions are in black. The Basilica was surrounded by cells for monks. A bema was got to the east by a descent of thirteen steps from the outer wall of the Roman Basilica, and has apses north, south, and east, much like St. Elias at Salonica. To the north and south of the east apse are two quadrangular chambers communicating with it.

## THE ROYAL ENGLISH OPERA-HOUSE.

Mr. D'Oyly Carte's new theatre, to the opening of which we have already briefly referred (see pp. 93 and 114, *ante*), and of which we gave an external view in our number for January 7 last, is situate at the junction of Shaftesbury-avenue with Charing Cross-road, and has its principal or eastern frontage facing Cambridge-circus. The building is bounded on the south by Shaftesbury-avenue, on the west by Greek-street, and on the north by Church-street, so that it forms a detached block by itself, with streets all round it. Thus, besides being, as we have already remarked, the only picturesque bit of theatre architecture in London, it is also unique, we believe, among London theatres, in being absolutely clear of contact with other buildings, and is thus exceptionally well situate for convenience of entrance and exit, and for lighting and ventilation. From this circumstance, apart from the nature of its construction, the danger from fire is reduced to a minimum, and the theatre, we understand, is deemed to be so safe in this respect that it is not to be insured. With the exception of the timber in connexion with the stage,—which is reduced to the lowest possible quantity, everything being of iron or steel instead of wood where possible,—there is very little wood in the place, and what there is has, we are told, been treated with a non-inflammable preparation. Besides this precaution, all the passages where the scenery is worked are fitted up with "sprinklers," which are in communication with large cisterns in the roof, and which can be brought into play by touching a spring-button. There are also fire-hydrants, &c., in all parts of the house. The whole of the floors, ceilings, and partitions, and also the roofs, are constructed with iron, steel, and fireproof concrete,—*i.e.*, concrete of which the "aggregates" are not of flint-stones, but of burnt ballast, and therefore not liable to fly. The internal surfaces, where not of marble or alabaster, are of Portland or Parian cement. The whole of the staircase walls, with the exception of those of the grand staircase, are lined with white glazed bricks, thus dispensing with whitewash or paper. The internal surfaces of the external walls enclosing the stage are also lined with white glazed bricks, thus ensuring not only cleanliness, but light-reflecting surfaces.

The building has been in progress since the latter part of 1888, when the foundations were laid. The site is an irregular parallelogram in shape, with its narrower end (concave on plan) towards Cambridge-circus. In consequence of the shape of the site, and of the necessity of having the stage at the wider or west end of the site, the auditorium diminishes in width as it recedes from the stage, but not in any marked degree, there being only a decrease of 14 ft. in width at the extreme end. It has been stated that this diminution in width has been deliberately planned for acoustic reasons. This is not so; it is simply due to the limitations of the site. Happily, however, it is reported on all hands that the acoustic properties of the building are very good.

A notable feature in the planning and construction of the auditorium is the absence of supporting columns to the various tiers or circles. Thus there is a good view of the stage to be obtained from every part of the house. Mr. J. G. Buckle, A.R.I.B.A., was consulted as

to the "sighting," or the general disposition of the "lines" of the auditorium so as to obtain an unimpeded view of the stage from every seat. There are three tiers, named respectively the Royal Tier Stalls, the First Circle, and the Amphitheatre. These tiers are constructed on the cantilever principle, and, it is claimed, in such a manner as to give a greater projection to the Circles than has previously been ventured upon. The whole of these cantilevers, with the braces, connecting girders, &c., are all formed of steel, and the tiers are calculated to sustain far greater loads of people than it would be possible to put upon them. Their rigidity, we are informed, has been tested under load and found to be most satisfactory. The steel work has been found to have a breaking-strength equal to 30 tons per square inch in section, and the construction is designed to sustain a load of 1 cwt. per square foot over the whole of the seating and corridor spaces in all the circles. It is further stated that the maximum load which it is possible to put on the tiers, together with the actual fixed load, produces a stress in no case exceeding 6 tons per square inch, or one-fifth only of the ultimate breaking-strength. The steppings and floors of these circles are of a light fire-resisting brick and concrete construction. The fronts of the circles recede from each other as they go upwards, the second tier receding from the first, and the third from the second.

The constructional iron and steel work in the building approximates to 450 tons in weight, and has been executed by the Horsley Iron Co., of Tipton, from the designs of Messrs. Neade & Riley, civil engineers. The whole of the window-frames and casements are formed of steel, and many of the doors are of iron or steel in combination with asbestos mill-board. A spacious entrance and an extra exit have been provided to each part of the house.

The sanitary arrangements of lavatories and conveniences are very complete, and have been carried out by Messrs. Dent & Hellyer.

A complete system of mechanical ventilation has been provided. Fresh air is forced into the house by a fan, and warmed or cooled on its way, as may be found necessary in winter or summer. The fresh air enters by "Tobin" tubes in various positions round the auditorium, and the inflow can be regulated by valves. The vitiated air is intended to find its way out through apertures formed in the soffits of the circles and connected with main flues which terminate in the roof, where exhaust-fans are fixed.

While it has been Mr. D'Oyly Carte's aim to promote the comfort of his audiences, the comfort and convenience of the artistes and staff have not been forgotten. The numerous dressing-rooms (those for the ladies on the upper floors and those for gentlemen on the lower floors) of the Shaftesbury-avenue front are all fitted with steam coils for warmth, and with lavatories provided with hot and cold water; they are, in addition, electric-lighted and comfortably furnished. Moreover, a lift is provided from the stage level to the different floors; this lift is surrounded by a staircase.

The electric light installation is one of the largest and completest to be found in any single establishment in London. One-half of the working plant is equal to providing the full requirements of the house, calculated to be between 2,000 and 3,000 lights. The whole of this installation, and the general wiring and fitting up throughout the theatre, was entrusted to Messrs. B. Verity & Sons, of King-street, Covent-garden. There is no gas-lighting whatever in the building, and the heating of the corridors and saloons is effected by means of steam coils.

Although the space allotted to the orchestra is large and roomy, affording seats and music-stands for 63 musicians, the seating capacity of the house is large, there being, we are informed, 1,976 seats for the public.

The principal entrances, in the Cambridge-circus frontage, lead into a large vestibule lined with coloured marbles. In this vestibule are situate the Box Office and money-takers' *guichets*. To the left is the grand staircase, constructed almost entirely of marble, and giving access to the Royal Tier Stalls and Circle levels, and continuing on to the Amphitheatre level. The refreshment saloons on the Royal-tier stalls and Circle levels are luxuriously fitted and richly decorated with marble work, &c. There are open loggias to the first two tiers, looking out on to Cambridge-circus, and affording accommodation for smokers. The floors in the saloons, &c., are of Algerian and Italian marbles, and the ceilings and friezes are decorated with painted panels containing emblematical figures, &c, as are the ceilings of landings and the soffits of the grand staircase. The fronts of the circles and boxes are finished in green and relieved with gold. The ceiling, which is of fibrous-plaster and carton-pierre, by Messrs. Jackson & Sons, instead of being level, is made to "rake" or incline upwards from the stage-front to the gallery. The line of inclination is almost parallel to that of the floor of the stalls and pit, which is on an incline of about 1 in 8.

Under the principal entrance in Cambridge-circus there is a "winter garden," including an American bar and smoking saloon, with an entrance from the Stalls corridor. The broad jambs and soffit of the proscenium arch are lined with marble and Mexican onyx, and the stage, which is one of the largest in England, is 66 ft. between walls, the height from stage to "gridiron" being 70 ft., thus enabling the scenery to be taken up its full height without what is technically known as a "bite." The depth below the stage floor is 30 ft. To go to this depth, so far below the street level, and to keep out the water, was a difficult and anxious work, and seemed for a time to baffle all efforts to render it watertight; the task was, however, accomplished, after successive linings of concrete and asphalte.

The whole of the plans, sections, and general details of the construction and arrangements have been prepared and carried out under the personal direction and supervision of Mr. G. H. Holloway, who has also acted practically as the builder, Mr. D'Oyly Carte electing to be "his own builder" and not to place the works in the hands of a contractor. Mr. Holloway will be remembered by many of our readers as the builder of the Hôtel Métropole, the Savoy Hotel, and other large buildings erected on the same principle.

When the building had nearly reached the street level, Mr. T. E. Collcutt, F.R.I.B.A., was commissioned to design the elevations, which have been executed in red brick and buff terra-cotta. The brickwork is exceedingly good, both in material and workmanship, the bricks being supplied by Messrs. Ellis, of the Ellistown Collieries, Leicestershire. The terra-cotta work is equally good, and has been executed by Messrs. Doulton & Co., of Lambeth. Mr. Collcutt is also, we are informed, responsible for the whole of the interior decorations. The painted decorations were executed by Messrs. Collinson & Lock, under the personal direction of Mr. Frank Collinson, jun. The drop-curtain is by Messrs. Heilbronner, and the upholstery by Messrs. Maple & Co. Mr. William Morris has supplied the carpets for the corridors, grand staircase, stalls, and floors of the principal boxes. The mechanical and lighting effects of the stage are very ingenious and complete, and save much labour and danger. They have been devised by Mr. Dando. By a very complete system of electric bells and speaking-tubes under the control of the prompter, messages or signals can be sent to all parts of the house behind the scenes, and the "call-boy" is superseded. Iron or steel is used behind the stage instead of wood wherever possible,—for instance, for the framing of the bridges, runners, "fly"-galleries, "grid-iron," &c.,—and instead of hemp ropes, ropes of a kind of steel wire which is said to be kink-proof are used. In addition to the names already mentioned, we are informed that the modelling for the terra-cotta work was done by Mr. Walter Smith. The marble work of the proscenium arch and of the saloons was executed by Mr. Houghton, of Great Portland-street, and that of the grand staircase and the floors by Messrs. Burke & Co.

In one of our "Notes" this week we refer to the general effect of the internal decorations.

## LECTURES ON ARCHÆOLOGY AT UNIVERSITY COLLEGE.

ON Monday, the 2nd inst., Mr. W. St. Chad Boscawen gave his third lecture* on Babylonian Archæology, the special subject being Babylonian Arts and Crafts. In commencing, he said that during the last few years important information had been gained as to the life of the earliest Babylonian population. For a long time Babylonian records were exceedingly scarce, and although we knew the archæology and culture of ancient Assyria, we knew very little of Babylonia. The discoveries of M. de Sarzec at Tel-loh, and of Mr. Rassam at Aboo-hubba, had, however, supplied us with a most valuable series of monuments, and the remains of many of the oldest and largest buildings of the country. Among these are the temple and palace built by Gudea, about B.C. 2500. The characteristic feature of Babylonian, as of Egyptian, architecture, was solidity, and this great palace, with its massive walls over 18 ft. thick, remained to give us a most perfect idea of the oldest of Oriental royal residences. Its general plan was quadrangular, the various portions of the building all being arranged around a great central court. On the right of the entrance were the State apartments of the king, with large reception-rooms or *salamlik*. Going through these by a narrow passage, connecting two guard-rooms, we enter the innermost part, or *harem*. Closely adjoining this, and overlooking it, was the temple, with its great seven-staged tower. On the opposite side of the great quadrangle were large storehouses and the servants' quarters, and in the centre a large cooling tank of water. Mr. Boscawen remarked on the close resemblance which existed between the buildings of Sargon at Khorsabad and Sennacherib and Assurbanipal at Nineveh, and said that it was one of those unchangeable characteristics of Eastern life, and from the earliest times the palace had followed this arrangement. He then proceeded to describe some extremely interesting ruins which had been found to exist beneath this edifice, one of the most curious features of which was a "step" brick pyramid which bore a great resemblance to the brick pyramid at Meydoom, which was supposed by many archæologists to be of Asiatic origin. That there was a connexion between the builder of this palace and Egypt had already been shown in a former lecture, and this was now an additional link in that connexion. Dealing with Babylonian sculpture, Mr. Boscawen said that its most distinctive feature was its truth to nature and very decided traces of portraiture. He then described the seated figures, which seemed to have formed the predominant style of royal or divine statues throughout Western Asia and Asia Minor. Speaking of the metal work, he mentioned that its principal characteristics were the early use of casting, of inlaying with gold, and the almost total absence of iron. Numerous references to the smelting of metals were to be found in the hymns and other fragments. The lecture closed with a description of the arts of pleasure, principally music, and a species of corybantic dancing. Mr. Boscawen's subject next week is Religion and Art in Babylonia.

On Thursday, the 5th inst., Professor Stanley Poole gave the second lecture* of his course on Archæology, his special subject being Greek Art. He said that in the study of this theme a great educational power would be found if we only selected properly from the great mass of material at hand, and did not follow the bad taste of former times. The period of high Greek art dates from 460-330 B.C. Everything before the former date is immaterial to us: everything after the latter date is deprived by circumstances of any interest. The revival of Greek art was due to the older races, and not to the Dorians. The Lacedemonians never produced works of high character. Prof. Poole then exhibited a drawing of the head of Pallas on a coin of the sixth century B.C., which was simply barbarous in execution, but this was, strangely enough, only a hundred years before the production of the marvels of the Parthenon; and a head of the same goddess on a coin dating just before the Persians (480, only twenty years before the Parthenon) was observed to show little improvement, the same silly "smirk" characterising the features. Athenian supremacy from 478-404 B.C. was most fruitful in art. Athenian art is indeed the union of the arts—architecture, sculpture, and painting; it is like a fine piece of music well executed, no one voice being heard above the others. Sculpture gives us the man, painting the moment; sculpture gives us character, painting gives us pathos or feeling. Painting, having to do with light and colour, gives us the momentary; sculpture, having to do with the man, gives us the form. Sculpture during the first period of Greek art was predominant. The value of coins to us is very great, as we have in them thousands of detailed examples which only require to be enlarged to give us the sculpture itself. There is no question as to their date, or as to their being true

* For brief reports of the first and second lectures of this series see pp. 70 and 90, *ante*.

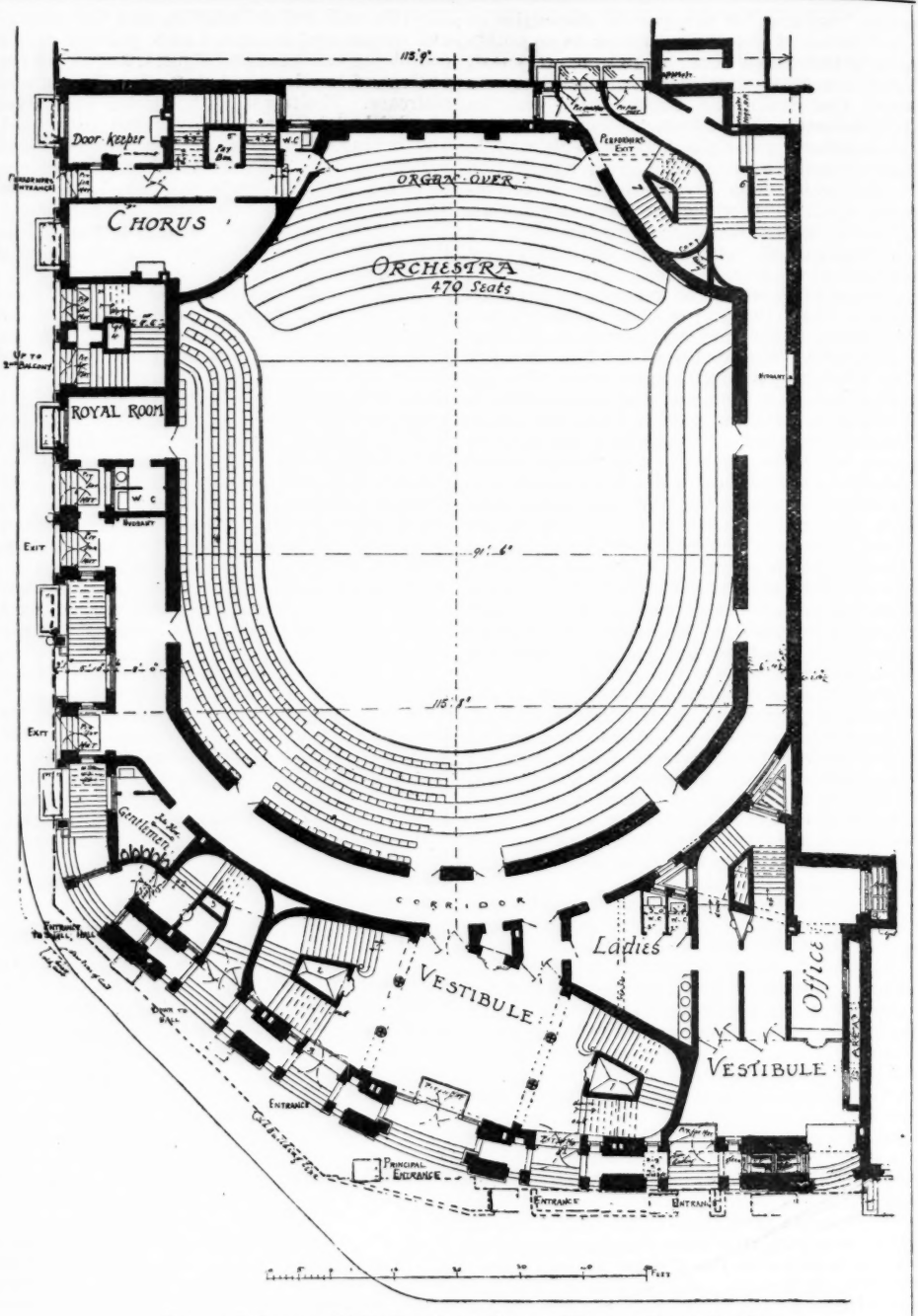
* For brief report of first lecture see p. 70, *ante*.

or false. How many pieces of sculpture, for example, have their *noses?* The fatal flaw of modern art is copying,—copying. Phidias may be looked on as the central figure in Greek art, although there can be no doubt that he did not execute all the figures of the Parthenon. There we have three kinds of sculpture: high relief, the frieze along the upper part, and the great statues of the goddess Athene, by Phidias himself. The medals, containing representations of combats, the centaurs, all show his master-hand in their harmony; while the statues on the two pediments are so carefully executed all round that it might be supposed that they were to be looked at from behind as well as before. There is only *one* bad figure amongst them all, and this must have been executed by some young man of high connexions and powerfully recommended to the great artist! Professor Poole went on to speak of Mycenæ and Syracuse, showing that the sculpture of the latter was twenty years later than that of the former, and illustrated his remarks by drawings, which showed the wonderful skill of the sculptor when representing eagles, &c. He pointed out that in Greek sculpture the *curves* never returned upon themselves, but, if extended, would go out infinitely, while in Italian art in the fourteenth century A.D. it was not so, and although the specimens were fine they were too pictorial. He drew special attention to the Quadriga (of Syracuse) and showed the rhythmic power of Greek art, all the sixteen legs of the horses being represented at rhythmic intervals, while the archaic attempts of this kind showed the legs all behind each other in military order. Professor Poole concluded by adducing additional proofs of his opinion that Greek painting is not to be placed alongside of Greek sculpture. His next subject will be the different local schools of Greek art.

## SOCIETY OF ENGINEERS.

THE first ordinary meeting of the Society of Engineers for the present year was held on Monday evening, the 2nd inst., at the Town Hall, Westminster. Mr. Henry Adams, the President for 1890, first occupied the Chair, and presented the premiums of books awarded for papers read during his year of office, viz.:—The "President's Premium" to Mr. W. H. Brothers for his paper on "Weighing Machinery and Automatic Apparatus in connection therewith." The "Bessemer Premium" to Mr. R. H. Tweddell for his paper on "Application of water pressure to machine tools and appliances." A "Society's Premium" to Mr. P. Griffith for his paper on "Treatment and utilisation of Exhaust Steam," and to Mr. W. Santo Crimp for his paper on "Sewer Ventilation." Mr. Adams then introduced the President for the present year, Mr. William Newby Colam, to the meeting, and retired from the Chair, receiving a hearty and unanimous vote of thanks for his services during the past year. Mr. Colam took the Chair and proceeded to deliver his inaugural address. After thanking the members for having elected him as President, he alluded to the very satisfactory position of the society, the muster-roll now showing a total of 448 members of all classes, and reviewed its work during the past year, which consisted in the reading and discussion of papers during the session and of visits to works of professional interest during the vacation. He then indicated the advances which have recently been made in the practical application of electricity, both as a motive power and as an illuminant, and which advances were but moderate. He referred to the opening of the City and South London Electric Railway, and described some projected lines which it was proposed to work on the same principle, observing that the working and financial result of the system on the South London Line was being closely watched in connexion with the further proposed applications. He then described the special points of an electric tramway system proposed by Mr. Mansfield, of New York, and which is on the "spot" principle. Referring to primary batteries, the President observed that it was some time since they were previously heard of, but that three had made their appearances during the past year, namely, the Renard, the Wegmersh, and an Italian battery.

The President said that he had only this week returned from an exhaustive professional tour through America, where he had been much impressed with the efforts that were being made to meet the modern demands for rapid transit in streets. He referred to many wonderful mechanical contrivances, some of which had been tried and condemned, others were being experimented with or were about to be tested as street motors. He thought that the cable system has given by far the best results mechanically and financially. He referred to what had been done abroad and in this country, and explained that the satisfactory results of the lines working in Great Britain had induced an important London Tramway Company to entrust him with the work of converting one of their horse routes to the cable system. He concluded by referring to the opening of the Forth Bridge, the satisfactory progress of the Manchester Ship Canal, the progress of the Nicaragua Canal, and the efforts now being made to resuscitate the Panama Canal. At the close of the address, which was attentively listened to throughout, a hearty vote of thanks was accorded to the President.




*Proposed Concert Hall, Langham-place.—Plan on Street Level.*

DEATH OF MR. CHARLES CARR.—We regret to have to hear of the death of Mr. Charles Carr, senior partner in the Woodlands Bell and Brass Foundry, Grove-lane, Smethwick, who died on the 16th ult. We are asked to mention that the business of the firm of Charles Carr will be carried on as usual by the family members of the firm.

ENGINEERING AND BUILDING EXHIBITION.—We have received the prospectus of "The Third Annual International Exhibition of Machinery, Manufactures, Appliances, and Inventions incidental to Engineers, Electricians, Builders, and Ironmongers," to be held in the Royal Agricultural Hall, Islington, from April 23 to May 2, 1891. The exhibition will be under the management of Mr. Harry Etherington.

# Illustrations.

## PROPOSED NEW CONCERT HALL, LANGHAM-PLACE.

WE give a view of the exterior and interior of this building, which is, we believe, to be commenced almost immediately. The following description of the work is furnished by Mr. T. E. Knightley, the architect:—

"For many years Langham-place has been disfigured by ugly and dilapidated buildings, extending from St. George's Hall to Riding House-street. These are now in course of demolition, and in their place will rise, and, I hope, be completed in twelve months, a large concert hall designed to accommodate three thousand persons. Questions of light and air obstructed progress, and necessitated placing the area and platform below the level of the street, but the facts that the site is a fine bed of gravel, and the sewer very deep, are favourable points in reference to this arrangement.

The first balcony (of which there are two) is on the street level; the entrance, therefore, will be central vertically to the façade. At the level of each floor, on flank and front, in addition to the surrounding corridor there will be loggie with doors opening on to them and several staircases, so that in the event of fire or panic escape may be easy and immediate. The loggie will serve also for lounge and promenade. Ample provision has also been made in the rear for the retreat and escape of artistes and staff.

On the lowest floor will be ornamental vesti-

bule, saloon, grill-room, &c.; at the street level, offices and two vestibules; on the first floor, foyer and saloon, and on each floor rooms for ladies and gentlemen; and above these a small concert-room.

The chief fronts will be built with Portland stone. The design contemplates columns coupled at their bases, with niches for busts; these are to rest on massive piers relieved with circular panels, each framing a bust of some eminent composer. The principal entrance will be marked by figures, standing on pedestals and supporting the entablature, which will be crowned by seated figures bearing musical instruments. The entrances right and left of the centre will have carved pilasters, side-lights, and ornamental ironwork; above each will be a curved corbelled balcony, with ornamental balustrading extending throughout the front. The venetian windows—five in number—will have each four mullions, caryatide-like in form, and the frieze charged with figures in low relief, emblematic of the uses of the building.

The front was designed of more imposing height, and above each pair of columns groups of figures were intended; but this had to be given up, the church and schools saying "No." The sharp angle formed by the junction of Riding House-street and Langham-place will be rounded off and the space thrown into the public way. The Riding House-street elevation is more simple, consisting mainly of a colonnade of two stories. The principals of the roof will be of steel, and to cope with the light and air difficulty the body of the roof is to retreat, the principals showing outside appearing as flying buttresses.

The feature of the internal design, which it is hoped may be most distinctive, is on the reversal of the lines usual in such cases,—frequently a horseshoe; in this one a parallelogram with a curved end, wind instruments being the inspiration. For example, the end of the horn is internally convex, and that form has been adopted for the orchestra. The junction between ceiling and wall is usually a hollow curve; in this case it will be the reverse. Some few months back when at Brighton I chanced to test the acoustics of the room which Mrs. Siddons always selected for her readings. It has a raised daïs at each end, and is designed to support a dome; the ceiling above each daïs towards the body of the room has a convex form, as in this case. The experiment was reassuring.

The walls of the auditorium will be lined with wood, fixed clear of the walls on thick battens; coarse canvas will be strained over the wooden lining, on which will be spread a film of composition, and on this will be raised ornament. The canvas is to check the vibrations of the woody fibres, and as vertical forms of support internally have been dispensed with, that the sound waves may not be broken, the hollow lining, it is calculated, may be as the body of the violin,—resonant.

The contractor is Mr. C. Wall, of Chelsea; and the raised ornament will be executed by M. Noel Quillett, of Paris. The view of the interior was exhibited in the Paris *Salon*, 1889, No. 64—5,201. T. E. KNIGHTLEY."

We may add that there is no doubt that a new and first-class concert-room for London, better planned and more comfortably arranged than St. James's Hall, is much wanted; but it is important to bear in mind that any hall which is to supply that desideratum must above all things have an ample and well-planned orchestra. Acoustically St. James's Hall is a very good room; its great fault, besides its inconvenient and ill-planned approaches, is in the cramped proportions of the orchestra; sufficient for a band, but not large enough for a chorus of adequate proportions in addition; and even the chorus that can be got in is wofully cramped and packed.

## ST. MARK'S, VENICE.

THE section of this celebrated building is reproduced from a drawing which forms one of the illustrations to Professor Aitchison's third Royal Academy lecture on Byzantine Architecture, which is printed *in extenso* in the present number.

## SEINE BRIDGES AT PARIS.

THE views of three of the Paris bridges here given are in illustration of the article on the subject on another page, to which the reader is referred.

## BEVERLEY MINSTER.

THE collegiate church of St. John is the larger of the two fine churches at Beverley. The eastern arm of the church, like Salisbury and Worcester Cathedral, has an eastern Early English transept, and the interior is remarkable for some very gorgeous monuments, including the well-known Percy Shrine. The staircase, a drawing of which, by Mr. Sakurai, we give to-day, led to the Chapter-house, and is in the north aisle of the choir, being Early English in style, like the portion of the building in which it is situated.

## THE ARCHITECTURAL ASSOCIATION.

THE usual fortnightly meeting of this Association was held in the meeting-room of the Royal Institute of British Architects, Conduit-street, on the 6th inst., Mr. Leonard Stokes, President, in the chair.

The minutes having been read and confirmed, Mr. J. Oscar R. Perry was elected a member of the Association.

Mr. E. S. Gale (hon. sec.) announced that the first sessional visit would be to Messrs. Hobbs' new buildings, Salisbury-street, Strand, at three o'clock on Saturday afternoon, February 14.

Mr. J. M. Brydon then read a paper entitled "The English Renaissance of the Eighteenth Century." At the outset he said that the present paper was a sequel to a paper read by him before the Association two years ago* on "The English Classic Revival of the Seventeenth and Eighteenth Centuries." In his former paper, however, so much space was occupied with the rise and progress of the style during its great age,—the seventeenth century,—that he was then able only very briefly and very imperfectly to notice the works of the later Renaissance of the eighteenth century. He now proposed to take up the thread of the story where he was then obliged to let it drop, and to notice a few of the great works of the eighteenth century, from the time of Wren to that of Sir William Chambers. He should limit his remarks almost entirely to civil architecture,—firstly, because he had already spoken of the principal churches in his former paper; and secondly, because what ever else the eighteenth century was, it was certainly not a great church-building period. On the contrary, it was a great house-building age. Something like two hundred mansions, many of them of vast size, were erected in England during that time, which was an age of great palaces, beginning with Blenheim and Castle Howard, by Vanbrugh, and ending with Somerset House, by Sir William Chambers. The period was a most eventful one for this country, politically and socially, and was teeming with poets and painters, statesmen and warriors, wits, beaux, and Court beauties. If any sentiment more than another was uppermost in that brilliant society, it was the cultivation of letters, along with the worship of the hero or lion of the day, and the general glorification of men and women as such, which naturally found its expression in the building of costly habitations wherein to house their persons and their partisans. In that Augustan age of England, there was no lack of brilliant men in architecture.

Who so fitted to open the ball as Vanbrugh, knight and poet, architect and Clarencieux King of Arms? Born in 1666, he spent his early years in France, and became a soldier while still very young. But the army did not seem to have been very much to his taste, as he soon resigned, and in 1695 we find him Secretary to the Commission for the Completion of Greenwich Hospital, where he was afterwards (in 1716) appointed Surveyor of Works. The first works that seemed to have brought him into notice were his plays, "The Relapse" being produced in 1697 and "The Provoked Wife" in 1698. During all this time, however, he must have been devoting himself to the study of architecture, and to such good purpose that in 1702 he produced his design for Castle Howard. He was at this time also Comptroller of the King's Board of Works, and in the thirty-sixth year of his age. Two years after this, in 1704, he designed Blenheim. So suddenly did this young man burst on the architectural world, that before he was forty he had two such mighty palaces in hand as those just named, and Swift wrote of him,—

> "Van's genius, without thought or lecture,
> Is hugely turn'd to architecture."

* See *Builder* for February 23 and March 2, 1889.

At that time, of the great seventeenth-century men, Wren was still busy building St. Paul's, the top stone of the lantern of which was laid in 1710. Wren was forty-two when he designed St. Paul's, and Vanbrugh was thirty-eight when he designed Blenheim, Wren being then seventy-two. Thus, for a short time, the two men were contemporaries; but nothing could be in greater contrast than the methods and the styles of these two architects. While Jones and Wren raised order upon order, Vanbrugh worked with only one, and thus introduced the chief characteristic of the eighteenth century, and paved the way to that everlasting feature, the portico,—so much so, that scarcely a house of any size was erected during that period without a portico, oftentimes with two,—and, in one house, at least, actually with four, one on each front. Then, again, to Vanbrugh belonged the founding of the English type of plan,—developed later with so much success,—the principal features of which were a central block with detached wings, often connected to the centre with curved colonnades, and enclosing a great entrance court in front: a truly palatial scheme, grandiose in the extreme, and to which the only proper manner of approaching the entrance was in a chariot with four horses and outriders. Magnificence and state were the orders of the day, and here was the *mise-en-scène* for their display. More than that, however, Vanbrugh in a very skilful manner combined the requirements of the state rooms of a palace with the apartments of a private mansion, resulting in a very stately arrangement of halls and corridors, showing a thorough mastery of the complicated problem.

At Blenheim, the Great Hall is a magnificent apartment, so was the Long Gallery or Library,—the latter a survival of a prominent feature in Elizabethan manor-houses, but here turned to other purposes. The weak point in the planning of Blenheim was the great staircase, or rather staircases, for there are two. They are long and narrow, badly arranged and badly lighted, and cut across the openings between them and the hall in the most awkward fashion. They seem to have been sacrificed to some false idea of symmetry. Had the architect but omitted one of the chambers looking into the courts at the side of the hall, and given us one magnificent staircase, lighted from the court, instead of the present two, the result would probably have been in every way satisfactory, and the plan would have gained one notable feature the more.

As to the architecture of Blenheim, probably no building had ever been assailed with more contradictory criticism from Pope and Horace Walpole,—who, content to live in a barbarous den at Strawberry-hill, could yet say of Vanbrugh: "He seems to have hollowed quarries rather than to have built houses,"—to our own Fergusson. If the combination of palace and mansion was difficult in plan, it was still more so in elevation. The work spoke for itself, and as a recent writer had said:—

> "It is a monument which, with all its errors of taste, its debased ornament and ponderosity of detail, bespeaks a fine sense of largeness of form, great power in the treatment of masses, a fertile fancy, and a bold, if not audacious, originality in the man who conceived it. It looks above everything what it was intended to be, but which, emphatically, it was not,—a nation's offering."

Mr. Brydon also quoted from Sir Joshua Reynolds, who said that,—

> "To speak of Vanbrugh in the language of a painter, he had originality of invention, he understood light and shadow, and had great skill in composition. To support his principal object, he produced his second and third groups and masses; he understood perfectly, in *his* art, what is the most difficult in ours,—the conduct of his background. . . . What the background is in painting in architecture is the real ground, on which the building is erected; and no architect took greater care than he that his work should not appear crude and hard—that is, it did not abruptly start out of the ground without expectation or preparation."

And Sir Joshua went on to say,—

> "This is a tribute which a painter owes to an architect who composed like a painter, and was defrauded of the due reward of his merit by the wits of his time, who did not understand the principles of composition in poetry better than he, and who knew little or nothing of what he understood perfectly, the general ruling principles of architecture and painting."

And no one who drove through the magnificent park, and over the bridge between the lakes into the great court-yard, but must acknowledge that Sir Joshua was right. Vanbrugh built many other notable works, besides Castle Howard and the Woodstock palace, but the author had singled these out as examples of

his work, because they were not only the best-known, but were the foundation both in plan and style of much that followed afterwards during the century. A new motive, as well as a new impetus, had been given to the building of English country houses, and as we turned over the pages of the "Vitruvius Britannicus," we began to realise the immense influence they had on all subsequent work. Probably on no one was that influence stronger than on Hawksmoor, Vanbrugh's assistant at Blenheim. He followed in his master's footsteps with several country houses of more or less note, and was the architect of the well-known churches of St. Mary Woolnoth, Lombard-street, and St. George's, Bloomsbury,—the former begun in 1716 and the latter several years later. These churches were in a manner,—particularly the former one,—an ecclesiastical version of the architecture of Blenheim, with the same grouping of masses, the same heaviness of detail, the same characteristic rustication. The interior of St. Mary's was really very striking; though a small church, only some 56 ft. long and 54 ft. broad, a great effect has been attained by very simple means. Twelve Corinthian columns, in groups of three at each angle, carry a square clearstory, pierced on each side by a large semi-circular window. The lighting is thus chiefly from the clearstory. This church has often been compared with Wren's St. Stephen's, Walbrook, though the plans of the general treatment are very different,—in fact, they present a striking contrast. Moreover, Hawksmoor shirked the problem of a galleried church. His galleries were mere excrescences, and had little to do with the structure of the design. When Mr. Butterfield re-arranged the interior in 1875, he removed the galleries, and the church gained vastly in effect from the alteration. The author wished he could say as much for the decorations Mr. Butterfield introduced. As to St. George's, Bloomsbury, it was long the fashion to decry, in no measured terms, its fanciful steeple with a statue of the wretched George I. on the top of it; "stuck like a wen to the rest of the building" as a critic of the time declared. For all that, the portico is not without dignity, and by sticking his steeple to one side, instead of on the roof of his portico, as Gibbs did at St. Martin's, and James at St. George's, Hanover-square, Hawksmoor showed himself a greater artist than either of them; and no one who saw the steeple before it was again blocked up with the present common-place flats but must have acknowledged how admirably it grouped with the church, with telling effect, from almost every point of view. But for the sake of a little more gain in ground-rents, it is built up once more.

A contemporary of Hawksmoor, and a pupil, like him, of Wren, was James Gibbs, the architect of St. Martin's-in-the-Fields. Having spoken of Gibbs's work at some length in his former paper, Mr. Brydon did not enlarge upon it in the present paper, but pointed out that the before-mentioned trenchant critic of St. George's steeple was found pleading for St. Martin's what has just been denied to St. George's. Writing just on its completion, the critic exclaimed:—

"I could wish, too, that a view was opened to St. Martin's Church. I don't know any one of the modern buildings about town which more deserves such an advantage. The portico is at once elegant and august, and the steeple above it ought to be considered the most tolerable in town."

Doubtless it would be, were it not astride of the sharp angle of the portico roof. Could critic Ralph have seen St. George's as we see St. Martin's he might have been more "tolerable" himself. Another critic, Walpole, who was nothing if not abusive, says of Gibbs that

"Like Vanbrugh, he had no aversion to ponderosity; but, not being endued with much invention, was only regularly heavy. His praise was fidelity to rules; his failing, want of grace."

But of Walpole himself another critic had said: "He would have sacrificed all the artists he ever commemorated for the sake of antithesis, or a pretty turn in a period."

While Vanbrugh, Hawksmoor, and Gibbs had been busily employed, the nation itself had been equally busy in history-making.

To the succeeding period, or just immediately before it, belonged Burlington House; then came the church of St. Mary-le-Strand, the Radcliffe Library at Oxford, and St. Bartholomew's Hospital, by Gibbs; the Horse Guards, by Kent; and the Mansion House, by George Dance. Most of these buildings were noticed in Mr. Brydon's former paper, but he wished to again call attention to the beautiful woodwork in the interior of the Mansion House, particularly in a room upstairs known as the Ball-room, which had all the character which he claimed as peculiarly English. The walls were panelled and divided into compartments by pilasters of the English Ionic order, excellently carved, and round the room ran a charming gallery. The whole apartment was a model of proportion, good taste, and elegant detail, well worthy the careful attention of the student.

Country-house building proceeded apace during the time of George II., and great Classic mansions became multiplied all over England. They were too numerous to mention, but generally speaking the portico craze was rampant in them all. An ultra-wild example of that mania was "Mereworth Castle," in Kent, by Campbell, which had four porticoes,—one on each front,—with a circular hall and dome in the centre. The force of absurdity could no further go. Specially notable among the houses of this period was Kent's masterpiece, Holkham, which he built for the Earl of Leicester. In the planning and the proportion of its rooms it was almost unrivalled. Its exterior was dignified and refined in detail, while its interior decorations, particularly the ceilings, were beyond all praise. Chambers, who was very chary of compliments, says of it,—

"It is exceedingly well-contrived, both for state and convenience; and with regard to the whole interior decoration, it may certainly vie, in point either of magnificence or taste, with anything now subsistent in England."

But while all this palace and mansion building was going on, there was gradually growing up the humbler vernacular of the Georgian domestic work which we, by some strange vagary, called "Queen Anne;" examples of which abounded in London and in most country towns throughout the kingdom. Under Walpole's vigorous sway, commerce had largely increased, money had become more plentiful, and as a consequence houses for the middle classes were in demand, and new quarters of the town were laid out and built over. The chief characteristics of these dwellings were good honest building in brick and woodwork. Though little was spent on their exteriors, still they had a quiet homeliness which was not without a certain dignity. And this was arrived at by very simple means, such as sash-windows brought out almost to the wall-surface, and surrounded by an architrave moulding; a panelled door of good proportions, surmounted by the familiar shell-hood, or adorned with a couple of columns and a pediment; some carefully-cut brick cornices with occasionally a few pilasters or quoins at the angles; and a wooden block cornice of excellent detail at the eaves. Internally, the rooms were of good proportion, sometimes panelled in wood with carefully-detailed cornices, skirtings, and chair-rails. Great attention was paid to such features as chimney-pieces and staircases, and to that period may be ascribed some of the best examples of the latter, with their broad, easy steps, turned and twisted balusters, and richly-moulded handrails. A type of one class may be found in the staircase of the Arts Club, Hanover-square; of another at the house, No. 9, Clifford-street, and a third in the staircases of the Mansion House. All this picturesque effect was obtained in the simplest and most natural manner. It was also thoroughly English, for one would never find it anywhere else,—a true and fit expression of the people for whom it was designed, a priceless legacy bequeathed to us by those humble artist-builders of the past, for which we could never be sufficiently thankful. Was it too much to plead for a return to their quiet thoughtful ways, for the abandonment of the senseless frippery and vagaries of modern "Queen Anne," where everything was so loud and vulgar and meaningless, so un-English and so unworthy of the cultivation of this highly cultured age? Whither was the work of the present day tending? He wished his hearers to consider whether to be busy and *outré* and what was called "original" was after all the highest aim, or likely to result in the truest art? He asked them also to study the ground deeply ere they launched out with some brand-new house, it might be in some old-time street or square,—to pause and think whether they had any right to intrude their so-called "Queen Anne" into the quiet harmony of the bygone life,—to throw the whole melody so generously played for us out of tune? Let them rather, with the reverence that befitted all true students of art and nature, seek diligently for the treasures enclosed in those old-world vessels, for haply they might find them and profit much thereby.

During the latter part of the eighteenth century the building of great mansions went on with little abatement. London was growing westwards at a great rate, and streets and squares grew into existence over the green fields and the daisies. We had a strong school of English painting, sculpture, and the drama. Shortly after the beginning of the reign of George III., in 1768, the Royal Academy was instituted, with Sir Joshua Reynolds as President and Sir William Chambers as Treasurer. To the latter's influence with the King the Academy owed its establishment thus early.

Sir William Chambers was by birth a Swede, having been born at Stockholm in the year 1726. In early life he went to sea, and visited the East Indies and China. He seems to have had a natural taste for drawing, as he sketched away during these voyages, and on his arrival in England in 1757, he published his sketches of the buildings and costume of the Chinese. After that he gave up his commercial life, and travelled into Italy and studied the great works of the architecture of the fifteenth and sixteenth centuries. He returned through France, and in Paris examined the works of the French Renaissance, sketching and making notes wherever he went. Shortly after his return to England, he became Instructor of Architecture to the Prince of Wales, afterwards George III., who became so fond of him, that when he came to the throne he appointed him his architect, and promoted him whenever he could. Thus was Chambers fairly launched on the high-road to fame and fortune. He laid out Kew Gardens, and designed a number of buildings and temples for their embellishment. He published views of these in 1763, and on presenting some drawings of the Gardens to the King of Sweden in 1771, his Majesty conferred on him the Order of the Polar Star. Ornamental gardening was a favourite subject with Chambers. He published a treatise on it in 1772, which was followed by a lampoon, said to be by Mason, the author of "The English Garden," and beginning with the following lines:—

"Knight of the Polar Star! by fortune plac'd
To shine the cynosure of British taste;
Whose orb collects in one refulgent view
The scatter'd glories of Chinese virtù,
And spreads their lustre in so broad a blaze,
That Kings themselves are dazzl'd while they gaze!"

Chambers had his early disappointments, like other architects. His design for Blackfriars Bridge was rejected in favour of Mr. Mylne's because it was too expensive,—a reason not unknown in latter-day competitions. His design for Lord Clive's villa at Claremont shared the same fate,—a design by "an intruder," as Chambers called him (the celebrated landscape gardener, "Capability" Brown), being preferred by his lordship. He seems to have made several designs for the new church then in contemplation for the parish of St. Marylebone; one, circular in plan, with a Doric portico, and surmounted by a dome,—a design said to have been very beautiful, but ill-adapted to the Church of England services. Ultimately the church was built by a pupil of Chambers's, Thomas Hardwick. It has the inevitable portico, facing that cheerful aspect, the north! Result: gloom and grime, instead of sweetness and light. Chambers's great opportunity, however, arrived in 1775. He was selected by the Government to make designs for the public offices to be built on the site of old Somerset House, and the first stone of the new building was laid in 1776. The general disposition of the building is so well known as hardly to require description; still, as we do not often get the chance of hearing a building described by its own architect, let Sir William Chambers speak for himself. In the report laid before the House of Commons on May 1, 1780, when the works had been in progress about four years, he tells us that:—

"The building which faces the Strand is now almost completely finished: it extends in front 135 ft., is 61 ft. deep, and has two wings, each 40 ft. wide and 42 ft. in depth, the whole being seven stories high.* It is faced with Portland stone. . . . All the fronts of this structure are decorated with a rustic arcade basement, a Corinthian order of columns and pilasters, enriched windows, balustrades, statues, masks, medallions, and various other ornamental works, necessary to distinguish this principal and most conspicuous part of the design, and likewise some profusion of ornaments to mark its superiority. Decorations, too, have been more frequently employed in the vestibule of entrance, and in all the public apartments of this build-

* *I.e.*, counting from the basement.

ing, than will be necessary in the remainder of the work, because the vestibule opens to the most frequented street in London, is a general passage to every part of the design, and the apartments are intended for the reception of useful learning and the polite arts,* where, it is humbly presumed, specimens of elegance should at least be attempted. The work just described forms the upper part† of a large quadrangular court, being in width 240 ft., and in depth 296 ft., surrounded with buildings 54 ft. deep and six stories high,‡ containing the Navy and other offices."

Then he told us how these buildings were progressing, and that the great river front, when finished, was, according to the general design, to be 800 ft. in length. Then came a description of the river terrace and of the heavy foundations necessary, followed by a reference to the architect's great bugbear, the cost. He wrote:—

"The building now erecting on the site of Somerset House is of a very uncommon kind,—unusually extensive, intricately complicated, and attended with many and great difficulties in the execution; whence it was at first, and is even yet, impossible to form an exact estimate of the expense. As far, however, as the architect's judgment and experience in business can guide him, he thinks it will certainly not exceed the sum of 250,000*l.*"

Poor man! How one can sympathise with him, and from one's "experience in business" feel little surprise that he was wofully wide of the mark, for it appeared from another report, in March, 1790, that 334,703*l.* had then been expended on Somerset House, and that 33,500*l.* was still required to complete the structure. Even that, as might be supposed, was not enough, and fully half-a-million was spent ere all was done, exclusive, of course, of the new wing facing Wellington-street, added by Pennethorne thirty-five years ago, and which has done so much to improve the general effect of the building as a whole.

The most striking features of Somerset House are the entrance loggia, the great courtyard, and the river front. The loggia has been compared and contrasted with the entrance to the Farnese Palace at Rome, but it is altogether different, both in plan and design. Without doubt the court is the most magnificent "quad" in London, just as the river front is unrivalled by anything yet erected on the Thames. Fault had been found with it as being too flat and lacking a dominating feature in the centre; but for all that, for broad simple treatment, and the stately dignity that befitted such a public building, we had nothing at all to come near it. A happy idea, as it seemed to the author of the paper, was that of the open-work screens at the end of the streets on each side of the central court, giving just that play of light and shade that was most telling when seen from the river. Somerset House was also a splendid example of excellent workmanship combined with a noble building material,—Portland stone,—in striking contrast with the rough-and-tumble surfaces and tawdry colour of terra-cotta and other ephemeral latter-day makeshifts,—just as the largeness of its general idea and the proportions of its parts are a rebuke to the frippery and littleness of much of our modern work.

Besides Somerset House, Chambers built several large mansions both in town and country, such as Woburn, for the Duke of Bedford, and a mansion in Piccadilly for Lord Melbourne. As an author he was even better known than as an architect, his "Treatise on the Decorative Part of Civil Architecture" being by far the most instructive work of the kind that has yet appeared in England.

A man of so many accomplishments naturally drew around him many of the most celebrated artists and men of letters of his day; Johnson, Goldsmith, Garrick, Burney, and Reynolds were amongst his friends; and with a few members of his own profession he formed a sort of club, known as "The Architects' Society," which held its meetings monthly at the "Thatched House" Tavern. Full of years and honours he died in May, 1796, and was buried in Westminster Abbey. With the close of Chambers's career came practically the close of the English Renaissance as it was understood during the seventeenth and eighteenth centuries. For two hundred years it had been the national style in which, with few exceptions, all buildings were designed. Into the "Adamite" style the author did not care to enter, for the vigour of the earlier work lived not in it. Some pretty conceits in external decoration were certainly produced; but it is difficult to understand how Robert Adam could have travelled and sketched and studied in Italy and Greece and returned only to give us the shadow instead of the substance of all he must have seen and known. The golden days of the English Renaissance were over, and though the tradition never quite died out of the land, still it was overwhelmed by the Greek revival; and within eighteen years of the close of the century, a competition for the new parish church at St. Pancras produced the building to be seen in Euston-road; a design avowedly made up of "bits" from its Athenian prototypes,—a church which cost twice as much as St. Martin's-in-the-Fields. Comparison would show which was the finer church. The coming-in of revivals was like the coming-in of waters: we could never tell where they would stop. Since the eighteenth century we had had some three or four. Each had strutted its little hour upon the stage and gone out of fashion for the next comer. We had been "everything by turns and nothing long,"—now Greek, now Goth, now new Queen Anne, until the art of designing great buildings as understood by the mighty men of old was becoming a lost art.

The study required to master the principles of light and shade, to acquire that skill in composition so valued by Sir Joshua Reynolds, was now frittered away in the elaboration of some pretty detail, till a Club-house became like a row of houses, a great public building like an apartment house, and our street façades like cabinet-work. Such buildings might be all very clever, but it was not by such superficial effects as they exhibited that we could hope to rival the productions of such masters as those of whom he had been speaking, either as works of art or as national monuments. It was a singular fact that, as already stated, Vanbrugh and Chambers were never trained as architects at all, as we understood the term. How, then, did they get their knowledge? Simply by study, by a diligent use of their eyes, their pencils, and their note-books.

In conclusion, Mr. Brydon took exception to a remark made by Col. Prendergast in the course of the discussion on Baron de Geymüller's paper on Bramante at the Institute meeting last week. The Colonel declared that at present the whole country was craving for Italian architecture. Mr. Brydon said he differed from that. It was true that things had become somewhat chaotic, but if he apprehended the drift of the current aright, it was not for Italian that the country was craving, but for an English architecture worthy of its best traditions. We must turn for inspiration, for guidance, and for instruction, not alone to Italian, but to English architects,—not alone to Bramante, or Palladio, or Vignola, but to Jones, and Wren, and Chambers, the great masters of our own national Classic, and to the school of which they were such illustrious exponents.

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Mr. H. O. Cresswell moved a vote of thanks to Mr. Brydon for his interesting paper, in which he had given them reason to feel proud of what had been done by English architects. Sir William Chambers was a man upon whose works they could not but look with admiration. Seeing what had been done by Vanbrugh and Chambers, the question arose whether it would not be a good thing for young men who wished to become architects to serve for a time as soldiers and sailors.

Mr. T. E. Pryce said he had great pleasure in seconding the motion. The present paper, as well as the one of which it was the sequel, had gone thoroughly into the subject. Touching the question of the education and practice of the architects of the time, one got just glimpses of it in such books as Evelyn's "Diary" and D'Israeli's "Curiosities of Literature." The last-named work contained a curious account of Vanbrugh's difficulties at Blenheim. Recently, in the *Journal of Proceedings* of the Royal Institute of British Architects, there had been published some interesting letters by Vanbrugh, which were well worth reading. Some time ago a friend was good enough to give to the Association some original letters written by Sir William Chambers; some of them were published in *A. A. Notes*, but he was sorry to say that their publication had been discontinued, owing to the disapproval expressed by some of the members, who thought that they occupied space which might have been better filled. Some of these letters referred to Chambers's connexion with landscape-gardening, and to the publication of his book on "Chinese Gardening," the history of which was exceedingly amusing.

Mr. W. J. H. Leverton, in supporting the motion, said it appeared to him that the characteristics of the English Renaissance architecture of the eighteenth century, were quietness and sobriety. The buildings of that period contrasted very favourably with most of the buildings of the present day, which were fussy and cut up with gimcrack ornament, or at any rate were too much overloaded with detail.

Mr. C. H. Brodie also supported the motion. He said he was very glad that reference had been made to the interesting letters by Vanbrugh which had appeared in the *Journal* of the Institute; and with regard to the letters of Sir William Chambers which had been presented to the Association, he hoped that their publication in *A. A. Notes* would be resumed. With regard to the early life of Vanbrugh and Chambers, he was disposed to think that if some of our young architects were to follow the example of those two distinguished men and go abroad for a few years before they commenced designing town halls and municipal buildings, it would be much better for them. It struck him that the manly character of the architecture produced by the great men to whom Mr. Brydon had referred, was largely due to the manly training which they had received.

After a few remarks from Mr. Bolton,

The Chairman, in putting the motion, said he desired to add his personal thanks to those of the members who had already spoken for the very interesting paper which Mr. Brydon had given them. But he could not go quite so far as the lecturer in his eulogy of Blenheim, which, although a very grand pile, was very depressing. As Mr. Leverton had pointed out, the characteristic of the work of the men to whom Mr. Brydon had been referring was simplicity of general form. Effect was obtained by reliance upon good proportion and simple straightforward lines. As to the advisability of young architects going abroad before commencing practice, there was no doubt that there was nothing like foreign travel for enlarging men's ideas. He quite agreed with what had been said to the effect that a large building ought not to be designed in such a manner as to look like a row of shops or tenement houses. He did not think that we could have a better example of the proper way of designing a large building than was afforded by Mr. Norman Shaw's new Police head-quarters on the Victoria Embankment, which, from the broadness of its masses and simplicity of its treatment, could not possibly be mistaken for an aggregation of smaller buildings.

The resolution was then put and carried, and Mr. Brydon briefly replied, expressing his indebtedness to Messrs. Baggallay, Pryce, Pennell, Jackson, and Miller for the very interesting drawings which they had kindly lent him for the illustration of his subject.

*Advanced Class of Construction and Practice.*—At the meeting of this class on Wednesday last, Mr. Owen Fleming read a paper upon the subject of "London Drainage," considering it under the following heads:—1. The present unsatisfactory nature of the drainage system of London houses. 2. The various regulations of the different Vestries governing the laying down of drains. 3. The desirability of framing a uniform code of by-laws for the whole metropolis. 4. The scope and nature of such by-laws. 5. Difficulties incident to the effectual administration of such by-laws. In the discussion which followed, Messrs. Goldsmith (chairman) and Satchell, A. W. Snell, Brodie, Harvey, and Cooksey took part.

## THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday afternoon, Sir John Lubbock, Chairman, presiding.

*Tenders.*—Tenders were received (*a*) for alterations to the Abbey Mills Pumping Station, and (*b*) for the construction of a weir, &c., at the Barking Outfall Works. (The lists will be found among the other lists of "Tenders" which we publish this week.)

*Technical Education.*—Nearly the whole of the remainder of the sitting was occupied with the discussion of a long report from the "Special Committee on Beer and Spirit Duties" as to the application of money derived from these duties, and accruing to the Council, for the promotion of technical education. It appears from the report of the Special Committee that

"In accordance with the resolution passed at the meeting of the Council on October 7, 1890, the sum

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* Meaning the Royal Academy and the Royal Society.
† *I.e.*, northern side.
‡ *I.e.*, counting from the basement.

of 140,000*l.* to be received under 53 and 54 Vic., cap. 60, for the financial year 1890-91, has been placed to the credit of the General County Account in relief of the rates. The further sum of £23,000 expected to be received on account of the year 1890-91 has not been so allocated, nor has any provision been made for the application of the sum of 163,000*l.* expected to be received on account of the year 1891-92. To these two latter sums the Committee have confined their attention."

The Committee's recommendations were:—

"1. That the sum to be received from the Beer and Spirit Duties on account of the current financial year, over and above the 140,000*l.* which has been placed to the credit of the General County Account, and which is estimated to be about 23,000*l.*, be devoted to the furtherance of technical education in London.

2. That in 1891-2, and so long as an adequate amount may be received from the Government for the purpose, a sum to be determined each year, but in no case to exceed the estimated produce of a 1d. rate, be devoted to technical education in London.

3. That a Standing Committee on technical education be appointed to consider and report as to the application of the money devoted from time to time by the Council to that purpose, and generally to deal with the subject.

4. That the money be given to the following institutions in the form of capital grants to be expended (save where specially ordered otherwise) in buildings, fittings, apparatus or plant to be used exclusively, or at any rate mainly, for the purpose of imparting technical education to persons of the artisan or labouring classes—

| Institution. | | | Amount of Grant. |
|---|---|---|---|
| Borough-road Polytechnic | | | £4,000 |
| Battersea | ,, | | 4,000 |
| Chelsea | ,, | conditionally upon the schemes being carried out within two years | 2,500 |
| St. Pancras | ,, | | 3,000 |
| Holloway | ,, | | 3,000 |
| Regent-street | ,, | | 4,000 |
| Working Men's College | | | 500 |
| Joint Committee of School Board, City and Guilds Institute, and Drapers' Company (having due regard to 52 and 53 Vict., cap. 76, sec. 1 (1)) | | | 1,000 |
| National School of Cookery (for training teachers) | | | 500 |
| University Extension Scheme (to organise lectures for artisans at low rates of admission) | | | 500 " |

As an amendment to the first recommendation, Mr. Benn moved,—

"That in view of the schemes which the Council now has or may hereafter take in hand for the housing of the working classes, the acquisition of open spaces, and similar efforts for the improvement of the condition of the London poor, the sum to be received from the beer and spirit duties on account of the current financial year (over and above the 140,000*l.* placed to the credit of the general county account) and also any further sums which may be derived from the same source, be carried to the credit of the general county account."

This amendment was carried, on a division, by 50 votes for to 45 against, and the further consideration of the subject was adjourned.

*Waterlow Park.*—On the recommendation of the Parks Committee, the Council agreed to an expenditure of 4,900*l.* for the laying-out of Waterlow Park and fitting it for the use of the public. After transacting other business, the Council adjourned.

## CLERKS OF WORKS' ASSOCIATION:

### ANNUAL DINNER.

THE eighth annual dinner of this Institution took place in the Venetian Saloon of the Holborn Restaurant on Monday evening last, Mr. Charles Barry, F.S.A., F.R.I.B.A., in the chair.

The usual loyal and patriotic toasts having been duly honoured, Colour-Sergeant Aitchison replying for "The Reserve Forces,"

Mr. J. Wilkinson proposed "The Architects and Surveyors," a toast which, he said, needed no commendation in that assembly. With the toast he coupled the names of Mr. James Brooks and Mr. Henry Lovegrove.

Mr. James Brooks replied in a felicitous speech, contrasting the present-day conditions of architectural practice with the conditions which obtained in the eleventh, twelfth, thirteenth, and fourteenth centuries. In Mediæval times, architects devoted many years and sometimes the whole of their lives to the erection of one building, but in the present day they were constantly flitting about by rail from one county to another, and from England to Scotland, Ireland, or Wales. Having to erect works in all parts of the kingdom, they could not possibly do without the assistance of competent and trustworthy clerks of works. In that Association architects knew they had an able body of honourable men upon whom they could always rely.

Mr. Henry Lovegrove replied on behalf of "The Surveyors."

The Chairman next proposed the toast of the evening, "The Clerks of Works' Association." He said that although the Association was as yet an infant of only eight years of age, it was in a very healthy and flourishing condition. In the eight years of its life it had gathered within its ranks no fewer than 125 picked men. He could not say how many men were willing to swell their ranks, but admission to membership was not obtained without close and minute scrutiny into the character and capabilities of the applicants. The constitution and objects of the Association were in every way praiseworthy, and from his own personal experience and the testimony of his friends who had applied to the Association for clerks of works they were fully adhered to and acted upon. The Association was not a benevolent society, and neither accepted nor sought outside aid. But one of its objects was to promote mutual aid and instruction by their meetings for lectures, papers, and discussions, and by the interchange of experiences. The clerk of works occupied a position of great responsibility and trust, and it was therefore an excellent thing for them to have an Association amongst themselves for promoting their practical efficiency and for maintaining the honour of its members. Considering the onerous nature of the duties of clerks of works, he must say he did not think that, generally speaking, their remuneration was adequate. Public bodies and all who were carrying out large and costly works which demanded the supervision of an intelligent clerk of the works might very well be expected to bear the very small extra cost which would be involved by paying an adequate salary to the clerk of works. At present the standard rate of payment which they received was decidedly too low. In conclusion, the Chairman said he gave the toast with the full conviction that he spoke the sentiments of all his professional colleagues in wishing the Clerks of Works' Association collectively, and its members individually, all health and prosperity.

Mr. R. Wheeler, President of the Association, briefly replied.

Mr. F. Dashwood, in a humorous speech, proposed "The Worshipful Company of Carpenters," coupled with the name of Prof. Banister Fletcher, past Master of the Company. Mr. Dashwood spoke of the great help which the Carpenters' Company had rendered the Association in its work.

Professor Banister Fletcher, in responding, invited the members to meet him some afternoon to see the new "Reference Architectural and Building Construction Museum" at King's College.

Mr. Linn Dillon next proposed the health of "The Hon. Treasurer" (Mr. John Oldrid Scott), which was received with great enthusiasm, Mr. Scott having been what was described as the foster-parent of the Association.

The other toasts were "The Press," proposed by Mr. Brady (who was good enough to speak of the *Builder* as "that grand old journal"), and coupled with the name of our representative; "The Visitors," proposed by Mr. P. J. King, and associated with the name of Mr. Charles Bell, F.R.I.B.A.; "The Chairman," proposed by Mr. T. Gamage; and "The Hon. Secretary," proposed by Mr. Webb.

## THE ASSOCIATION OF PUBLIC SANITARY INSPECTORS OF GREAT BRITAIN:

### ANNUAL DINNER.

THE eighth annual dinner of this Association was held on Saturday evening last, at the Holborn Restaurant; Dr. B. W. Richardson, F.R.S., President, in the chair. The attendance was large, and included Sir Joseph Fayrer, the Hon. Albert Hood, Mr. Woolner, R.A., Mr. Wyke Bayliss, F.S.A. (Society of British Artists), Dr. J. S. Bristowe, Mr. David Chadwick (formerly M.P. for Macclesfield), Captain W. H. James (ex-Chairman of the Sanitary Committee of the London County Council), Dr. Douglas Lithgow, Mr. John Smeaton, and other gentlemen well known in the sanitary world. After the loyal and patriotic toasts had been disposed of,

Captain James responding for the "Army, Navy, and Reserve Forces,"

The Chairman gave the toast of the evening, "Success to the Association." The toast, he said, deserved the approbation of all, because of the "magnificence" of the work the members of the Association performed. That term might be thought singular, but it was justified, for they devoted themselves to the reduction of death and sickness and sorrow—and there could not be finer work for man to perform than that. The enormous importance of their work was well shown at the Health Congress held at Hastings two years ago, when Mr. Wilson Noble, in an address to the sanitary section, stated that there were in our country 125,000 deaths per annum from preventible causes. Reckoning for each case of sickness a duration of 18½ days, the money lost to the nation in wages, at the rate of only 2s. per day, would amount to 7,750,000*l.* If only half the people were in the ranks of the labourers this preventible disease meant a loss each year of the work of 1,000 men for 100 years, when the extra days lost during illness and convalescence were added. In other words, the work of 100,000 men was annually abstracted from the productive industry of this country by sickness that was preventible. To prevent disease was the work of the members of the Association, and more magnificent work could not fall to the lot of man. They went to the foundation of the evil by attacking the primary causes of disease, and not unfrequently the devotion of the inspector cost him his life. Knowing as he did the value of their work and the devotion of these men, it was with the utmost cordiality that he proposed the toast, and wished all success to that national association of sanitary inspectors.

The toast having been duly responded to,

Mr. McMillan, Q.C., proposed "Science and Art," coupled with the names of Sir Joseph Fayrer and Mr. Wyke Bayliss.

Sir Joseph Fayrer said the medical profession was deeply indebted to the inspectors; and to the ministration of the members of the Association the profession might look for a continuance of improvement in sanitary science, which had made such marked progress of late.

Mr. Wyke Bayliss, in the course of his response, drew an interesting parallel between art and sanitation. The Association and art were fighting the same battle, and under the same banner. One word, "Health," was inscribed on the banner of the sanitarians, and the artists had on their banner also one word, "Beauty," and the two words were the same, for without health there could be no beauty.

Dr. J. S. Bristowe (Medical Officer of Health for Camberwell) next proposed "The President."

Dr. Richardson, in replying, said he had been reminded of his early career by his friend, Dr. Bristowe, recalling the fact that forty years ago he had received his first lessons in sanitary science during an epidemic of cholera from Professor Sir Richard Owen, and had been associated in practice with Dr. Robert Willis, the translator of the works of Harvey, Spinoza, and Cervetus. In succeeding Sir Edwin Chadwick as President of that Association, he had succeeded a man of most remarkable character, and attained to an honour which he esteemed more than any that had been conferred upon him. He should regard it as a privilege to serve the interests of that Association as long as his life might be preserved.

In responding to the toast of "Municipal Local Government," subsequently proposed by Mr. E. Lewis Thomas, M.A., LL.B.,

Mr. Harry Wilkins, Vestry Clerk of St. James's, Westminster, dealt at considerable length with the Metropolis Water Supply Bill, introduced by Sir Algernon Borthwick, the provisions of which were, he thought, worthy of consideration.

The next toast was "The Executive," proposed by Mr. H. H. Collins, F.R.I.B.A., who testified to the valuable services rendered by sanitary inspectors to local authorities, and referred to the great difficulties under which such authorities were often placed by the ambiguity of the sanitary laws and the conflicting decisions of judges. Mr. Hugh Alexander, Chairman of the Council of the Association, and Mr. R. Farrow, of the Staffordshire Branch, responded to this toast.

The last toast was "The Visitors," coupled with the names of Mr. Thomas Woolner, R.A., and Dr. Douglas Lithgow, who both responded, Mr. Woolner making a very interesting speech, in which he contrasted the present conditions of life with those which prevailed in the time of Bishop Latimer, Erasmus, and John Shakspeare, father of the poet, observing that when we read the records of the manners and customs of those days, we ceased to wonder at the plagues and pestilences which so often broke out and devastated whole towns. Dr. Douglas Lithgow also briefly replied.

## *COMPETITIONS.*

PROPOSED NEW BATHS, COVENTRY.—The assessor appointed to adjudicate upon the thirty-nine sets of plans received in the competition for new baths for the Coventry Corporation has awarded the first premium of 100*l.* to Mr. Harold T. Burgess, London, and the second of 50*l.* to Messrs. John Giles & Gough, London.

NEW PUBLIC OFFICES, HUYTON-WITH-ROBY, LANCASHIRE.—At the monthly meeting of the Huyton-with-Roby Local Board, held at the Public Offices, Blacklow-brow, a report of the sub-committee appointed to examine the competitive plans for the new public offices was read. Thirty-one plans were examined, and they awarded the first prize (50*l.*) to No. 23, second (30*l.*) to No. 24, and third (20*l.*) to No. 27. On referring to the names, the successful competitors were:—First, Mr. H. A. Cheers, Twickenham; second, Messrs. Boney & Wainwright, London; third, Messrs. Woolfall & Eccles, Liverpool; recommending, on the advice of the assessor, the plan of Mr. Cheers for adoption by the Board. The adoption of the report and recommendations was put and carried.

PROPOSED WESLEYAN CHAPEL, CUDWORTH.—The design of Mr. Charles T. Taylor, A.R.I.B.A., of Oldham, has been accepted in competition for proposed new Wesleyan Chapel, Cudworth, near Barnsley. The work is to be proceeded with at once.

STUDENT'S COLUMN.—We are obliged to hold over this for a week.

BRITISH ECONOMIC ASSOCIATION.—Mr. A. J. Balfour and Mr. John Morley have been appointed Vice-Presidents (in addition to Mr. Leonard Courtney and Mr. H. C. Childers) of this Association, which now numbers about 500 members. The journal of the Association will be published by Messrs. Macmillan, and the first number will appear at the end of March.

## Books.

*Bibliothèque des Merveilles. Les Statuettes de Terre cuite dans l'Antiquité.* Par E. POTTIER. (Paris: Hachette.)

PERHAPS no branch of archæology is so interesting to the amateur as that of terra-cottas. It requires no training to appreciate the beauty of the Tanagra figurines, no science, no scholarship to understand their significance. Hence they have always been eagerly sought for by the collector, and for no objects of ancient art have such purely fancy prices been paid. This being the case, it is somewhat strange that in English we have no handbook on the subject; a chapter or two in general manuals of archæology is all that is accessible to any but the specialist. M. Pottier's book will probably have a wide circulation in England, and not go long untranslated. He is a first-rate authority on the subject, his position as *attaché* at the Louvre giving him every opportunity for close and protracted study. His investigations in the kindred subject of vase-painting are well known, and he handles vast and scattered material with that ease and lightness which seem to be the specialty of the French *savant*. In his introduction he fixes the place of terra-cottas in the study of archæology generally. Ten chapters are then devoted to their chronological sequence, beginning with some account of Oriental "motives," and taking the subject down to Roman and Gallo-Roman times. Then follow two chapters which might, we think, have come first, on the "fabrication" of terra-cottas and their "destination." We may quote M. Pottier's admirable concluding summary:—"Il-y-a un double enseignement à tirer de l'histoire des terres cuites antiques. Le sont des œuvres d'art et des *ex-voto*. Elles sont produites par l'accord des deux sentiments les plus profonds chez la race Héllénique, le goût du beau et l'instinct réligieux. Voyons dans chacun de ces éléments ce qui peut intéresser la vie moderne." The book has ninety-two wood-cuts, mostly taken from the atlas of M. Henzey's "Catalogue des Figurines Antiques."

*The Building and Machine Draughtsman.* By various Practical Draughtsmen. (London: Ward, Lock, & Co. 1890.)

THE above work, consisting of some 300 pages of closely-printed matter and a large number of illustrations, is written essentially for the young student about to learn the use of drawing instruments. Part of the matter has already appeared in the *Industrial Self-Instructor*, and the Editor of that periodical now publishes it in one volume, by which means he is enabled to treat the subjects much more fully.

Considerable care has been taken by the several authors to treat each subject in a clear and practical manner, so that the book may be of assistance to those who are unable to secure the services of a master.

*Maximum Stresses under Concentrated Loads.* H. T. EDDY, C.E., Ph.D. (New York: D. Van Nostrand Company. London: Trübner & Co. 1890.)

WHEN a train passes over a bridge, there is a certain position it must occupy to cause the greatest stresses in the girders supporting it, and the author of the above work shows how this position can be easily determined by a new graphical method.

The work is divided into two parts. Part I. deals with simple girders and single intersection trusses under concentrated loads, and Part II. with cantilevers with two supports, and double intersection trusses with end supports. The proof of the several graphical constructions used is given in algebraic form.

The subject can hardly be considered one of general engineering interest, but the name of the author is sufficient to recommend the work to the specialist in bridge construction.

*Geometry of Position.* By ROBERT H. GRAHAM. (London and New York: Macmillan & Co. 1891.)

NOT many years ago the man who possessed the information now contained in "Molesworth Engineering Pocket-Book" would command sufficient learning to solve nearly all the questions that an engineer of his day could be expected to answer. To-day, however, the case is very different, as hardly a week passes without some more or less important work being published with which it is necessary for scientific men to make themselves acquainted; and if it were not for the fact that a large proportion of the books contain little that is really new, the reading to be done would be so considerable, that little time would remain for the practical application of the knowledge obtained.

Mr. Graham's book, however, will appear to most English students as decidedly original, as it is the only work in our language upon the modern science which the French and Germans have named the geometry of position. The study of this science has now been made compulsory in the Federal Polytechnic of Zürich, in Strasburg University, and in other similar institutions, for on the Continent graphical statics are more generally used than in England.

In the first portion of the book the author deals with such problems as illustrate chiefly the theory of the subject, but the last four chapters are devoted to such practical matters as the application of reciprocal figures to finding the stresses in roofs and girders, determining the centre of gravity of various figures, the construction of ellipses of inertia and kerns, and the solution of questions relating to the elastic line, particularly in connexion with continuous girders. At the end of each chapter, Mr. Graham has appended a set of examples, all of which can be worked out by the principles he has previously established.

Although this book is comparatively small, yet it represents much labour on the part of the author, and those who are making a study of graphic statics will act wisely by adding this volume to the list of works which they intend reading in connexion with that subject.

*Memorials of Edinburgh in the Old Time.* By Sir DANIEL WILSON, LL.D., F.R.S.E. Edinburgh: Adam and Charles Black; 1891. Parts I. and II.

THIS is a second and amended edition of Dr. Wilson's work, appearing in parts. It contains much interesting writing about old Edinburgh, with a good many fairly-executed engravings representing old monuments, some of them now removed. There is however a somewhat antiquated style about the illustrations, and the author's architectural information is not up to the mark, as he gives under the title "Norman Capital from Holyrood" (page 59) an engraving of what is a fully-developed Early English capital, with nothing Norman about it.

*Preliminary Survey and Estimates.* By THEODORE GRAHAM GRIBBLE, Civil Engineer. (London: Longmans, Green, & Co., 1891.)

THE above book is the most recent addition to that useful series of works, known as the Text-books of Science.

The work is written more particularly for those about to open up a new country, and much of the information given is derived from American practice, but it contains also some useful matter which will be found of service to civil engineers and surveyors at home, who are engaged on Parliamentary or similar work.

When a new line of railway is proposed, the promoters generally ask an engineer to advise them on the following points. Firstly: if any kind of line is feasible. Secondly: whether it is likely to pay. And, thirdly: what type of railway would be most suitable, and what style of rolling-stock. They also ask the engineer to furnish a plan and estimate of one or more routes which he considers eligible.

The first question the author dismisses at once, for nowadays a railway may be constructed nearly anywhere,—if the money can be found for the purpose,—and provided it can be shown that there is every prospect of the proposed line earning sufficient to pay the shareholders a fairly good dividend, there is little chance of the capital not being forthcoming.

In the first chapter, the author states that a single line, with rails of 30 to 40 lb. per yard, and with engines from 15 to 20 tons, can be made in an easy country for 4,000*l.* per mile, including the equipment, in almost all parts of the globe, provided the line starts from the seaboard, or from a place in railway connexion with the seaboard, and that such a line, properly located, is capable of handling 1,000 tons of freight a day, and is, therefore, even with low rates, in a position to yield about 10 per cent. on the cost of construction.

Such a line cannot be located except by an experienced man. The gradients and curves to be adopted and the class of rolling-stock that will be most suitable all require careful consideration, and the author gives such information,—partly taken from standard works on the subject,—but chiefly from his own experience, that cannot fail to be of great value to all engaged on work of this nature.

In the second chapter of the book Mr. Gribble deals with Route-Surveying or Reconnaissance, describing the methods most suitable to different circumstances, and explaining the various projections adopted in ordinary map construction. In the two following chapters will be found such information on Hydrography, Hydraulics, and Geodetic Astronomy as is likely to be required for the preliminary work in a new country; these are followed by others on Tacheometry, Chain-Surveying, Curve-ranging, Instruments, and Preliminary Estimates. The manner of using the slide-rule for arithmetical calculations is also given, and the mathematical tables and formulæ likely to be required are placed in an appendix. A glossary, explaining the scientific terms that have been used, will be found at the end of the book.

That the description given may be clear and intelligible, some 130 illustrations are scattered throughout the book, and no pains seem to have been spared to render the work as complete as possible, and to treat in a concise form, and in a thoroughly practical manner, those subjects with which civil engineers and surveyors should be acquainted.

*G. Richard Lepsius. Griechische Marmorstudien.* (Aus dem Anhang zu den Abhandlungen der Kgl. Preuss. Akademie der Wissenschaffen zu Berlin, 1890. Berlin: Reimer.)

AN archæologist has occasionally need to be a geologist. The need for a careful specialist examination of the *materials* of Greek sculpture and architecture, and for a precise determination of their nomenclature, has long been felt. This need Dr. Lepsius meets in the treatise before us, which might be called a handbook of *petrography*. He meets it, too, in a way calculated to be serviceable to the student who is not a geologist; the descriptions of the several varieties of marble are full and clear, and easy to be understanded of the layman. How much marbles differ in constitution, and how important to clearly understand this difference, may be seen from a single instance. Every one who visits Athens marvels at the beauty of the gold-red colouring of the columns of the Parthenon, the Theseion, the Propylæa, but how few know that this is due to the fact that the marble employed in these structures contains —,122 of oxide of iron ($Fe^2O^3$), which, when the surface of the marble is corroded by the action of the atmosphere, is converted into oxyhydrate of iron, a strong colouring matter. On the other hand, the columns remaining of the Temple at Sunium are still of their original glittering white. Analysis shows that the marble here contains no particle of oxide of iron. The book is one that no one interested in ancient sculpture or architecture can afford to neglect.

Waterlow Brothers & Layton's "Architects', Surveyors', and Auctioneers' Diary and Almanac for 1891" (London: 24, Birchin-lane) is an excellent production, well arranged, well printed, and well bound. It contains, besides the usual miscellaneous information, lists of members of the Institute of Architects, the Surveyors' Institution, the Institution of Civil Engineers, and other professional societies; a digest of Acts of Parliament relating to buildings (including the Metropolitan Building Acts and Metropolis Local Management Act); an index to the General Statutes; general conditions for building contracts (sanctioned by the Institute of Architects); the Institute's schedule of rules for professional practice and charges of architects; a list of District Surveyors; the regulations of the Superintending Architect's Department of the London County Council; the By-laws framed by the Metropolitan Board of Works under the Building Acts; and a large variety of other matters of special interest to the architectural profession and the building trade. It will be found exceedingly useful.—Messrs. Hayward Brothers & Eckstein, of Union-street, Borough, send us a useful quarto desk-diary, interleaved with blotting-paper, and forming, at the same time, an illustrated catalogue of the patent "semi-prism" pavement-lights and other well-known specialties of the firm.—The Eastern Telegraph Company, Limited, send us a useful little pocket-diary, giving the rates per word

from any telegraph-station in the United Kingdom to the Mediterranean, India, China, Australia, Africa, New Zealand, South America, and other parts of the world, together with several coloured maps.——Messrs. Shand, Mason, & Co., send us an effective little office calendar, printed in colours from a picture specially painted for the firm by Mr. John Charlton. The subject is a steam fire-engine, drawn by a fine pair of dappled greys, and fully manned, hastening to the scene of a fire.——"The Garden Oracle" for 1891 (London: *Gardeners' Magazine* Office) is the thirty-third annual issue of that useful little book, which fully maintains its right to its title. Among the contents is an interesting article on the "Early History of the Chrysanthemum," by Mr. C. Harman Payne. This article is illustrated with numerous portraits of horticulturists, English and foreign, whose names are associated with the European history of this flower.

## Correspondence.

*To the Editor of* THE BUILDER.

### "WHO IS RESPONSIBLE?"

SIR,—Can any of your readers inform me who is legally responsible in the following matter:—

An architect prepares drawings and specifications for a house.

With the sanction of the client, the quantities are taken off by a "quantity surveyor."

The "bills of quantities," having been prepared, are sent out, and tenders received from several "builders" for the building.

One of the competitors obtains the contract, of which, however, the "bills of quantities" do not form a part.

The works are carried out.

The "quantity surveyor" is paid for the builder for the "bills of quantities."

At the finish an omission is found to have been made in the "bills of quantities."

The builder claims payment for same.

The "quantity surveyor," whilst admitting the error, pleads non-liability.

The "client" declines to admit liability, on the ground that the contract was to be carried out in accordance with the signed and figured drawings and specifications, and which have been adhered to.

If any of your readers can inform me on whom rests the responsibility in this matter, it will be gratefully acknowledged by— ALPHA.

*** As the law now stands there is no doubt that under the circumstances detailed by "Alpha" the loss must fall on the builder. The law holds that the delivery of bills of quantities implies no warranty of their accuracy; the quantity surveyor is held by the law to be bound by no condition other than that which binds any professional adviser,—lawyer, architect, or engineer, viz.: that he should have brought fair and reasonable skill and care to the work demanded, but that he is not to be expected to be infallible. On the principle of *caveat emptor*, the law would hold that the contractor should himself test the quantities to a certain extent, which is exactly what contractors object to do; not without reason, from their point of view. We have before expressed the opinion that the law on this point is based on a misapprehension of the essential difference between the position of a quantity surveyor and that of a professional adviser, such as an architect. The architect may advise the use of a certain stone, for instance, and if that stone turns out unsatisfactorily and decays, the architect may show that he used his best skill and judgment in selecting it. But the quantity surveyor is asked to calculate how many cubic feet of such stone are required in the work, *i.e.* he has to state a fact, not to give an opinion; and if the architect's drawings are sufficient and clear, stating the correct amount is only a question of correct measurement and arithmetic, which ought always to be possible. In fact, as we have before said, if the quantities are not correct they are not "the quantities." The law, however, does not recognise this distinction; and the builder has no course but to abide by the law.—ED.

### ADJOINING OWNERS.

SIR,—I read with considerable interest your article on "Adjoining Owners" under the Metropolitan Buildings Act. The question what constitutes ownership within the meaning of the Act seems to me a fairly clear one, for an Act of Parliament, viz., an occupier or tenant with a holding of more than one year. I have had a large experience of party-walls, and I now always serve the freeholder, leaseholder, and all sub-leaseholders with notices who hold any term above the one year. This, in the City of London, necessitates very often half-a-dozen notices, and there is no objection to this course. The difficulty would arise if the several tenants required a separate award as provided for by the Act. I should like to see a decision of one of the courts on this point. Usually a tenant is only too glad to hand his "registered notice" to his superior landlord and so get rid of an unknown responsibility in the matter. The section of the Act referring to awards requires amending. Would it be too much to ask the London County Council among its many duties to get this clause amplified and made clear?

At the present time, as a "Building Owner's" Surveyor it is necessary to find out who are the several surveyors acting for the "Adjoining Owners," and also to pick up the several notices and get, if possible, the surveyor acting for the superior leaseholder to consolidate the notices and so prepare the way for a single and simple award under the Act.

MARTIN L. SAUNDERS.

## *GENERAL BUILDING NEWS.*

PROPOSED PUBLIC BATHS, BATLEY.—On the 5th inst. a meeting of the Batley Corporation was held in the Town Hall, Mr. John Lodge (Mayor) presiding. The Mayor moved the adoption of a recommendation, passed by the General Purposes Committee, that plans prepared by Mr. W. Hanstock, architect, for public baths, at an estimated cost of 10,000*l.*, be adopted; and that the Town Clerk apply to the Local Government Board for sanction to borrow 10,000*l.* for that purpose. The resolution was ultimately carried.

RESTORATION OF ASTON PARISH CHURCH.—The restoration and enlargement of the Parish Church of Aston has just been completed, and the Bishop of Worcester (Dr. Perowne) consecrated the eastern extension on the 7th inst. The gift by an anonymous donor of a chancel, the Erdington Chapel and organ chamber (with all the windows filled with stained glass and the floors of marble mosaic), has been supplemented by other offerings in order to complete the work at the east end of the church. These consist of a reredos extending along the five sides of the apse; the centre portion of which is divided into three panels canopied and carved, with side buttresses and pinnacles crocketted. The other four sides are divided into panels also canopied, with carved cornices and brattishing. Sedilia are placed in the north and south sides, and a credence shelf on the south side. As regards the sculpture, the centre of the three panels immediately over the Communion table is represented as the Ascension, on the right hand side is the Resurrection, and the left the Transfiguration. At the top of the buttresses dividing the five sides of the reredos are niches, with carved canopies and pinnacles, which contain statues of St. Matthew, St. Mark, Moses, St. Peter, St. Paul, Isaac, and St. Luke. The whole of the work has been executed in alabaster from the quarries near Tutbury, the subjects in panels being of white alabaster. In addition to the reredos, a moulded alabaster altar rail has been added. The whole of the work has been carried out from the designs and under the superintendence of Mr. Chatwin, the architect of the restoration; the work in the reredos has been carried out by Mr. R. Bridgeman, of Lichfield, and the brasswork by Messrs. Thomason, of Birmingham.

THE NEW PUBLIC-HALL SCHEME IN NEWCASTLE.—A meeting of the Newcastle Town-hall and Municipal Offices Committee was held on the 9th inst. The question of Mr. Laing's proposal to convert the present Butcher and Vegetable Markets into a City Assembly-hall was considered. A letter was read from Mr. Laing to the effect that he proposed to have a seventy-five years' lease; the expenditure of a sum of money to be fixed upon for the structural work, to excavate the centre, and place a butter and poultry market underneath the proposed City Hall; to pay a rent equal to the present net rentals obtained from the whole of the shops, and to hand over without any consideration the whole of the new buildings proposed to be erected by him at the termination of the lease. The Committee came to the conclusion that, having regard to the importance to the question, it should be referred to the Council for further instructions as to whether they would be willing to dispose of the present markets.

NEW REREDOS, ALMONDSBURY CHURCH.—There has just been erected in Almondsbury church, Gloucestershire, a new oak reredos. The retable is moulded and carved with vine leaves and grapes, and above this and running the full length of the reredos are three panels of carved tracery. The structure is divided into three bays, the centre portion of which is canopied and groined, with carved patterns at the junction of the ribs. On either side are niches for figures. The canopy consists of traceried panels, divided by carved and crocketted pinnacles, each terminating with carved pendants. Immediately above this tracery there is a carved string-course with shields inserted at equal distances, on which are carved the emblems of the Passion. Over this is a carved cresting. At each division of the three bays are octagonal-shaped and traceried turrets, which are again divided into three portions by small crocketted gables fixed to each face of the octagon, and at each angle of these are heads of various shapes. The turrets are surmounted by a crocketted dome, with a carved finial at the apex. The work has been executed by Messrs. Jones & Willis, of Birmingham, from the designs of the architect, Mr. C. E. Ponting, of Marlborough.

NEW HOUSE AT BUCKLAND, BUCKS.—A house has been completed here for the Rev. Edward Bonus, from the designs and under the superintendence of Mr. Edward Swinfen Harris. The walling is of Blisworth stone, lined internally with brick, the dressings being of Monk's Park and Box Ground Bath stone. The ground floors throughout are covered with Vigers & Co.'s wood blocks. The stone chimneys are very varied in outline and general treatment. There are three reception rooms, each opening internally out of a large hall, which rises to the roofs, and round which the principal staircase is taken. The woodwork in hall and reception rooms is of oak. The south front contains a loggia, into which the sitting rooms all open. The general contractor is Mr. Grist, of Bierton, near Aylesbury.

OPENING OF NEW WING, MONKSTOWN HOSPITAL, DUBLIN.—The new wing of Monkstown Hospital, Dublin, was recently opened. The new wing, which is a brick building, contains two sections—the sanitary and observation. The former is 32 ft. long by 23 ft. deep, is two stories high, and is erected to the rear of the main building. It is fitted with modern sanitary appliances, and contains a mortuary and *post-mortem* room. The second or observation section of the building is 45 ft. long by 18 ft. The works were entrusted to Mr. Henry Pemberton, of Killiney, and Messrs. Maguire, of Dublin. The plans were prepared by Mr. F. A. Butler, architect, Dublin, and the cost of the addition has been about 3,500*l.*

ST. MICHAEL'S CHURCH, COVENTRY.—We are informed that "an addition to the comforts" of the congregation of St. Michael's Church, Coventry, has been effected by the casing of the north door in oak, on similar lines to those existing on the other side of the church. Heavy curtains have also been hung over the porch door and the great west door. These works were entrusted by the churchwardens to Messrs. Jones & Willis.

NEW CHANCEL, ST. MATTHEW'S CHURCH, TWIGWORTH.—The consecration of the new chancel of the Church of St. Matthew's, Twigworth, Gloucester, took place on the 29th ult. The works comprise the removal of a gallery from the west end of the church, the pulling down of the small chancel and the east walls of the nave and north aisle, and the removal of the small vestry. In the place of these, the nave and north aisle have been extended in an easterly direction, and space has been provided for a chancel of fair proportions. The roof of the new part of the north aisle is a continuation of the old roof, but that in the chancel is partly of open timber construction with panelled boarding. The old seats have been lowered, and the backs made to slope; the floors of the whole building have been repaired, and the new floors have been laid with wooden blocks and encaustic tiles. A chancel-screen of pierced and carved tracery work in pitch pine, executed by Mr. H. Frith, of Gloucester, has been erected between the chancel and the nave. Two new painted-glass windows, by Messrs. Clayton & Bell, has been placed in the nave, and the three-light window in the south wall of the chancel is about to be filled with glass from the same firm. The work has been carried out by Mr. W. J. Parker, contractor, of Longford, from the designs of the architects, Messrs. Waller & Son, of Gloucester.

RESTORATION OF THE PARISH CHURCH, MEAVY.—The parish church of Meavy, Devon, has lately undergone restoration, the chancel floor having been taken up and relaid with marble. The immediate steps to the altar are made to a circular sweep on plan, and are composed (as are the whole of the steps) of white Sicilian marble treads and risers. The altar pace is of red Devon, inlaid with circular panel of green Devon (Kitley). The whole of the remainder of the floor is made up of black and white marble squares. The work has been carried out from the plans of Mr. J. D. Sedding, of London, by Messrs. J. & E. Goad, of Plymouth.

NEW PULPIT, ST. STEPHEN'S CHURCH, BRISTOL.—The Society of St. Stephen's Ringers, Bristol, have just provided a new pulpit for St. Stephen's Church. The new pulpit is in the English Gothic style of the fifteenth century; it is octagonal in shape, and of Caen stone. The superstructure is composed of tracery and panel work, with groined niches at the angles. The panels are filled in with blood-red marble, known as Rosso Antico, from the old Roman quarries on the north coast of Africa, and the circular bosses between the canopies are of similar marble. The body of the pulpit stands upon groined stone work also of octagonal shape, the intersection of the several ribs being carved with natural foliage; below this is a group of eight shafts alternately of polished Purbeck and Ippiepen marble, each shaft being girt with a band of Mansfield stone. The shafts rest upon a circular base of red Devonshire marble, and this stands on a foundation of blue pennant stone. The interior of the pulpit is lined with English oak, and the steps from the chancel to the pulpit will be provided with a brass railing. The figures which stand at the several angles of the pulpit are of white alabaster from the quarries of Staffordshire

and each figure occupies a place in a niche, the base of which is borne by angels with outspread wings and uplifted hands. The central figure is that of Our Lord as the Good Shepherd. The other figures represent St. Stephen (the patron saint of the church), St. Joseph of Arimathea, St. John the Baptist, St. John the Divine, St. Peter, and St. Paul. The designs for the new pulpit were prepared by Messrs. Pope & Paul, architects, Bristol, and the work was executed by Mr. Harry Hems, of Exeter. The cost of the pulpit was 350*l*.

## *SANITARY AND ENGINEERING NEWS.*

EXAMINER OF PLUMBERS' WORK, CITY GUILDS' INSTITUTION.—We are informed that Mr. John Smeaton has been elected examiner of Plumbers' Work at the City and Guilds of London Institute. The appointment, we understand, is tenable for five years, subject to annual re-election.

THE SANITARY ASSURANCE ASSOCIATION.—The tenth annual meeting of this Association was held on Monday last at the offices, 5, Argyll-place, W., the President, Sir Joseph Fayrer, in the chair. Mr. Joseph Hadley, Secretary, read the annual report, which referred to the work of the Council in promoting the Sanitary Registration of Buildings Bill, and said:—"At the opening of the Session of 1891 the Queen's Speech contained the welcome announcement that Her Majesty's Government had a sanitary measure in preparation, and therefore the Council passed the following resolution: –

"That the Council of the Sanitary Assurance Association learns with satisfaction from the Queen's Speech that the Government have in preparation a Bill for consolidating and amending the laws relating to Public Health; that a memorial be presented to the Prime Minister, urging the Government to incorporate in their Bill for consolidating and amending the Public Health Acts, the essential features of the Sanitary Registration of Buildings Bill."

A memorial has been accordingly prepared for presentation to the Marquis of Salisbury. The income of the Association for the year 1890 was 469*l*., and, after meeting all liabilities, a balance was carried forward. On the motion of the President, seconded by Mr. Henry Rutherfurd, barrister-at-law, the report was unanimously adopted. Surgeon-General Cornish proposed the following resolution:—

"That the petition to the Prime Minister requesting the Government to make such provision in their Bill for consolidating and amending the laws relating to public health, as will secure the registration of buildings in some such manner as proposed by the Sanitary Registration of Buildings Bill, 1890, be approved, and that copies be forwarded to the governing bodies of the Institutions which took part in the Sanitary Registration Conference of 1887, with a letter requesting them to sign the petition, and take part in its presentation."

This was seconded by Mr. Andrew Stirling, and supported by Mr. Mark H. Judge and Dr. Willoughby, and carried unanimously. Sir Joseph Fayrer having some time since announced his intention of retiring from the presidency of the Association, having held the position for ten years, on the motion of Mr. Rutherfurd a hearty vote of thanks was accorded to him for the services he had rendered to the cause of sanitary improvement generally, especially in connexion with the work of the Sanitary Assurance Association. — Surgeon-General Cornish, the Sanitary Commissioner with the Madras Government, was then elected President of the Association, and Sir Joseph Fayrer and Professor Roger Smith Vice-Presidents. Lord Henry Bruce, M.P., and Professor Roger Smith were re-elected members of the Council.

SEWERAGE OF WHITCHURCH (SOMERSETSHIRE).—The Keynsham Rural Sanitary Authority have adopted the report of Mr. A. P. I. Cotterell, Assoc.M.Inst. C.E., Bristol, upon the sewerage and sewage disposal of Whitchurch, and have instructed him to prepare the necessary plans and estimates for the Local Government Board.

CLONMEL WATERWORKS.—A Local Government Board inquiry was held on the 3rd inst., at Clonmel, in Ireland, with reference to an application from the Corporation for a Provisional Order for the purchase of lands and a loan of 14,437*l*. 10s. for the construction of waterworks. Mr. Cotton, C.E., Local Government Board Inspector, conducted the inquiry. The Corporation advertised an open competition for the best scheme, and, acting under the advice of a London assessor, they finally selected the plan prepared by Mr. W. H. Radford, C.E., of Nottingham, and engaged him to superintend the works. Mr. Radford explained the plans and scheme. One acre of land was required for a service reservoir, a small quantity of land for the water intake, certain mill water rights, and rights of way. The present water supply is from shallow wells, very liable to contamination and very hard. A public supply is required for fire-extinction, sewer-flushing, closets, baths, domestic use, and trade purposes. The population to be supplied is 12,000, and the estimated quantity required is 225,000 gallons a day, but much more than this can be supplied. The water will be taken from the Glenmorgan mountain stream, about three miles from the town. There is a watershed of 1,700 acres on the Old Red Sandstone, chiefly moorland and mountain farms. There are many constant springs above the intake. The water is described as soft and pure, and it is stated that there will be an ample supply of water in the stream from day to day in the driest summer, and therefore no impoundage is necessary.

## *STAINED GLASS AND DECORATION.*

MEMORIAL WINDOWS, ELSWICK-ROAD CHAPEL, NEWCASTLE.—Four memorial windows have just been placed in Elswick-road Wesleyan Chapel, Newcastle. Each window contains one large figure. The subjects were designed by Miss Kate Stephenson, and stained by Messrs. Atkinson Brothers, of Newcastle.

MEMORIAL WINDOW, CHURCH OF ST. MARY, BATHWICK.—The memorial window to the Rev. Prebendary Scarth, which has been placed in the parish church of St. Mary, Bathwick, Somerset, was unveiled on the 1st inst., by the Mayor of Bath, Mr. Jerom Murch. The window, which is in the north aisle, near the organ, is by Messrs. Clayton & Bell. The figures of the Twelve Apostles are represented.

## *FOREIGN AND COLONIAL.*

FRANCE.—A special exhibition of the works of Meissonier, at the École des Beaux-Arts is talked of. Many owners of his works have offered to lend them for the occasion.——The exhibition of lady artists will be opened at the Palais d'Industrie on the 21st; and the annual exhibition of the "Independent Artists" on the 20th of March, at the Ville de Paris Pavilion on the Champ de Mars.——The Académie des Beaux-Arts has elected M. Bailly (architect) as president in place of Meissonier, and M. Paul Dubois (sculptor) as vice-president in place of M. Bailly.——The death is announced at Versailles of M. Alfred Rozat de Mandres, a retired Inspecteur-General des Ponts et Chaussées. This distinguished engineer was born in 1815 at Vic-sur-Seille, and carried out some remarkable works at Paris, especially the lowering and covering over of the Canal St. Martin on the site now known as the Boulevard Richard Lenoir. The archives of the Ponts et Chaussées contain various interesting papers and memoranda by him on the subject of proposed sanitary and engineering improvements to Paris.——A painter who obtained some success in various salons, M. Jean Benouville, is dead at the age of 76. He was a pupil of Picot and painted what may be called historic landscapes, one of which gained him the medal of honour of the Salon. The committee formed to raise subscriptions, at Charleville and Sedan, for the memorial to soldiers who fell at Sedan in 1870, has received a considerable sum from London as the contribution of Frenchmen resident in the English capital.——The Académie des Beaux Arts is considering the subject of the possible restoration of the Church of St. Jonin-des-Marnes (Vienne), a sumptuous monument of the eleventh and twelfth century, the facade of which presents some very fine sculpture.——There is also talk of carrying extensive repairs to the celebrated Church of Soulac (Gironde). Soulac, which is a bathing station at the extremity of the department of Medoc possessed a Romanesque church which, about twenty-five years ago cleared out in the dunes.——The Ministry of Fine Arts has commissioned from M. Adolphe Appian, a well-known landscape-painter of Lyons, a large picture for the decoration of the new Prefecture of Lyons.——A special exhibition of the drawings and designs of M. Laisne, the architect recently deceased, is spoke of; to be in the large hall of the Cercle de la Librairie, Boulevard St. Germain.——The collections of the late M. Eudoxe Marcille are not to be sold, but one picture from the collection, "L'Ame," by Prudhon, has been offered to the Orléans Museum.——There is some talk of the rebuilding of the Palace of St. Cloud, which would then become the summer residence of the President of the Republic, in place of Fontainebleau, which is too distant from Paris.

NORWAY.—The second committee appointed to consider the designs for the new Opera-house at Christiania, to which we have previously referred, these being the designs of Herr H. Bull and Herr H. Berle under consideration has given the commission to the former architect.

THE ENGLISH IRON TRADE.—The English iron market continues very quiet. The amount of actual business that is being put through is yet exceedingly small, buying being still only for pressing wants. At the same time the market keeps steady, and the confident tone shown by producers is no doubt due to the fact that they are taking a reasonably hopeful view of the future. There have been some slight fluctuations both in warrants and pig-iron sold to consumers, but there are no actual reductions from last week's prices, makers upholding their quotations pretty firmly, being encouraged in their attitude by better shipments. Finished iron and steel are very quiet, and the competition for steel orders especially is very keen. Still, rates do not change much, manufacturers being unable to make concessions owing to the high cost of raw materials and fuel. There are no changes in the shipbuilding and engineering trades, which keep fairly well employed.—*Iron.*

## *MISCELLANEOUS.*

BRITISH ARCHÆOLOGICAL ASSOCIATION.—At the meeting of this Society on Wednesday, the 4th inst., Mr. W. de Gray Birch, F.S.A., in the chair, Mr. J. M. Wood exhibited a series of Roman earthenware vessels and fragments which have recently been found at Colchester outside the circuit of the Roman walls. Among these were some portions of vessels of Samian ware, having patterns of great beauty, and the handle of an amphora inscribed with N and T conjoined, and the name C ANTONI. . . Mr. Way pointed out that some of the patterns on the Samian ware were identical with several found in London. Mr. Way exhibited a curious nutcracker of early seventeenth-century date, having a man's face in front, together with various articles found in recent excavations at the corner of Godliman-street, St. Paul's. Also a cannon-ball of early date which has been found at Tiverton, having a link to attach it to another ball, after the manner of modern chain-shot. It is probably a relic of the times of the civil wars. The second part of a paper by Mr. Macmichael on the early signs of the tradesmen's shops of the City of London was then read. Many of these signs were of historical interest, derived from the heraldic bearings of powerful families, or were allegorical, or illustrative of special events. Sometimes they had a comic meaning or had punning reference to the name of the founder of the business, the booksellers' shops being numerous, and having a goodly array of signs. The section of the paper read treated of the central portion of the City, the eastern part being reserved for another occasion. A large series of illustrative drawings from the collection of Mr. H. Syer Cuming, F.S.A., were exhibited by the lecturer.

THE REGISTRATION OF PLUMBERS.—Mr. Burdett-Coutts, M.P., presided at a public meeting held in the Burdett-Coutts Hall, Westminster, on the 3rd inst., whereat the Baroness Burdett-Coutts presented the prizes and certificates of merit awarded by the Worshipful Company of Plumbers to the students in the plumbing classes at the Townshend Endowed Schools. There was a large attendance, including Mr. W. H. Bishop (Master of the Plumbers' Company), Mr. Chas. Hudson (Warden), Mr. Philip Wilkinson, F.R.I.B.A. (Renter Warden), Mr. Alderman Knill (Past Master), Mr. F. Machin (Past Master), Sir Philip Magnus, Mr. John Smeaton, Miss Cons, Miss Lankester (Sec. National Health Society), Mr. C. T. Millis (Technical Instructor), Dr. Dudfield (Medical Officer, Kensington), Mr. W. Titmas, Mr. G. Clegg, Mr. R. A. Nurse, Mr. J. Browning, and a number of other master and operative plumbers. Mr. Burdett-Coutts having opened the meeting, Mr. W. H. Bishop (Master of the Worshipful Company of Plumbers) gave details of the origin and progress of the registration movement, and stated that there was an increasing demand for registered plumbers, not only in all parts of the United Kingdom, but in the Colonies and abroad. Sir Philip Magnus moved a vote of thanks to the Baroness, which was seconded by Mr. Tomlinson, M.P., and carried. Mr. J. Marsden, of the St. Stephen's Institute, then moved:—

"That this meeting desires to record its opinion that it is essential to the health and comfort of all classes of the community that the plumber's craft should be brought under such systematic regulation and control as to insure the efficient training of its members, and that this can be best effected by the system of National Registration, which requires plumbers to pass qualifying examinations; and the meeting further desires to direct the attention of Parliament to the necessity for legislative enactments to effect these objects."

Mr. Alderman Knill seconded the motion, which was carried, as were votes of thanks to the Plumbers' Company and to the chairman.——The first annual public meeting of the Ulster District Council for the National Registration of Plumbers, has been held in the Council Chamber, City Hall, Belfast, the Mayor in the chair. The Secretary (Mr. W. Morton) submitted the annual report, which stated that "of thirteen towns in Ulster, containing upwards of 5,000 inhabitants, nine have now at their disposal the services of duly qualified men certified by the Worshipful Company of Plumbers, London. These towns are as follows:—Armagh, Ballymena, Belfast, Enniskillen, Coleraine, Lisburn, Lurgan, Newtownards, and Portadown." In the course of the proceedings, Mr. Bretland (City Surveyor of Belfast) referred to the introduction of by-laws with regard to the sanitation of Belfast. The Corporation and the Water Commissioners had inaugurated a new era so far as the erection of buildings was concerned. He had, in his official capacity, recently observed that there was less trouble in getting what they considered the proper thing than that which was not permitted under those by-laws. That was partly attributable to the installation in Ulster of the National Association of Registered Plumbers, which, he hoped, would go on prospering in their midst.

A NEW ATLAS.—Messrs. Cassell & Co. announce a new atlas to be published by them in twenty-eight monthly parts, at a cost of one shilling per part. We have seen no specimen map as yet, but if it fulfils all that is promised it will be a valuable work for the price at which it is offered.

# COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

## COMPETITIONS.

| Nature of Work. | By whom Advertised | Premium. | Designs to be delivered. |
|---|---|---|---|
| *Hospital | Poplar Hospital Com. | Not stated | Feb. 24 |
| *Technical School, Rochdale | The Committee | 50*l.* and 25*l.* | Apl. 11 |
| *Covered Market, Arcades and Shops, Halifax | Markets and Fairs Committee | 100*l.* 50*l.* and 30*l.* | May 1 |
| *Board School | Chadwell St. Mary School Board | Not stated | No date |

## CONTRACTS.

| Nature of Work or Materials. | By whom Required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. |
|---|---|---|---|
| *Cleansing, &c. and Keeping in Repair, Southwark Bridge | Committee for Letting Bridge House Estates | *Official* | Feb. 16 |
| Sanitary Pipes, Freestone, &c. | Darlington Corporation | do. | Feb. 17 |
| *Removal of Dust, &c. | Lambeth Vestry | H. McIntosh | do. |
| *Making-up Roads | Rotherhithe Vestry | E. Thomas | do. |
| Two Houses, Builth Wells | Evan Evans | Telfer Smith | do. |
| Dyehouse, Providence Mills, Wakefield | G. Lee & Sons, Lim. | William Watson | do. |
| Fire-clay Retorts, Fire Bricks, &c. | Leeds Corporation | *Official* | Feb. 18 |
| Wet and Dry Gas Meters | do | do. | do. |
| New Schools and Master's House, East Stanley | Tanfield School Board | Davidson & Bendle | do. |
| Paving Setts (large contract) | Halifax Corporation | E. R. S. Escott | do. |
| Transit Warehouse, Middlesbrough Dock | N. E. Railway Co | William Bell | do. |
| *Masons' and Paviors' Work | Westminster Vestry | G. R. W. Wheeler | do. |
| New School Buildings, Dewsbury | Govr's Wheelwright Grammar Schools | J. Lane Fox | do. |
| Short Railway Line, Hartlepool | Martin & Fenwick | | Feb. 20 |
| Taking-down and Re-building Inn, Pellon-lane, Halifax | | Jackson & Fox | do. |
| *Alterations and Additions to Infirmary | Salisbury Infirmary | J. Harding & Son | do. |
| Church, Barry Dock, Glam. | Rev. J. Honey | Seward & Thomas | do. |
| Paving, Iron Castings, &c. | Birmingham Corportn | W. S. Till | do. |
| Transit Shed, Avonmouth Dock | Bristol Corporation | J. M. McCurrich | do. |
| Four Houses, Lincoln-road, Peterborough | | J. G. Stallebrass | do. |
| *Works, Materials, &c. | Surbiton Impt. Com. | *Official* | Feb. 21 |
| 100 Cottages, Aberdare Junction | Carnetown Cottage Co. Lim. | | do. |
| Church, Ashington, Northumberland | J. W. Sweet | | do. |
| 25 Cottages, Consett, Blackhill, co. Durham | Consett Iron Co. Lim. | | do. |
| *Supply of Materials | Hendon Local Board | S. S. Grimley | Feb. 23 |
| *Works and Materials | Mortlake Highway Bd. | H. Richards | do |
| Mission-room, Class-rooms, Caretaker's House, &c. Hunslet, Leeds | | Geo. E. Danby | do. |
| Under Frames, &c. for Carriages | India Office | *Official* | Feb. 24 |
| *Waterworks, Teversal | Mansfield U.R.S.A. | G. Hodson | do. |
| *Roadmaking and Paving Works | Willesden Local Board | O. Claude Robson | do. |
| *Works and Materials | do. | do. | do |
| *Works and Materials | Sheffield Town Coun. | C. F. Wike | do. |
| Sewerage | Dundalk Twn Commrs | J. Gaskin | do. |
| *Works and Materials | War Department | *Official* | Feb. 25 |
| *Fire Brigade Station | Chiswick Local Board | A. Ramsden | do. |
| *Paving Works | Hackney Board of Works | J. Lovegrove | do. |
| Road from Tredegar to Argoed | Tredegar Local Board | G. A. Lundie | do. |
| Road from Tredegar to Argoed | Bedwellty U.R.S.A. | do. | do. |
| 19 Houses and Shop, Hopwood-lane, Halifax | | George Buckley & Son | do. |
| Retort House, Boiler House, &c. | Cirencester Gas Co. | Thos. Newbigging | do. |
| *Cleansing and Watering Streets, &c. | Chiswick Local Board | A. Ramsden | do. |
| *Works and Materials | Hammersmith Vestry | H. Mair | do. |

## CONTRACTS.—*Continued.*

| Nature of Work or Materials. | Architect, Surveyor, or Engineer. | By whom Required. | Tenders to be delivered. |
|---|---|---|---|
| *Foundation Works, Asylum | Dorset County Lunatic Asylum | G. F. Hine | Feb. 26 |
| *Works and Materials | Lambeth Vestry | H. McIntosh | do. |
| *Works and Materials | Vestry of St. Mary, Islington | *Official* | Feb. 27 |
| Gasholder Tank | Ashton-under-Lyne Gas Co. | David Clarke | Feb. 28 |
| Wrought-iron Work, Steam-pipes, &c. | Stafford Corporation | W. Blackshaw | do. |
| Farm House and Buildings, Hope, Flint | Lnestr's Charity Trees | J. Whalley & Son | do. |
| Additional Aqueduct, Loch Katrine | Glasgow Corporation | Mr. Gale | do. |
| *Building Materials | War Department | *Official* | Mar. 2 |
| *Infectious Diseases Hospital | Borough of Blackburn | do. | do. |
| *Isolation Hospital | Brentford Local Board | J. H. Strachan | do. |
| *Sewerage Works | Hornsey Local Board | T. de Courcy Meade | do. |
| *Making-up of Private Roads | do. | do. | do. |
| *New Isolation Block at Hospital | do. | do. | do. |
| *Foreman's House at Highgate Depôt | do. | do. | do. |
| *Works and Materials | do. | do. | do. |
| *Making up Roads | Acton Local Board | W. J. Ebbetts | Mar. 3 |
| *Escape Staircases | Wandsworth and Clapham Union | T. W. Aldwinckle | Mar. 5 |
| *Works and Materials, Weymouth Sub-District | War Department | *Official* | Mar. 6 |
| *Making up Road | Wanstead Local Board | do. | do. |
| Hotel Work, Limerick | James Flynn | Robert Fogarty | do. |
| Hartshill Stone Road Metal, &c. | Brackley Highway Bd. | W. J. Treadwell | Mar. 7 |
| *Works and Materials | War Department | *Official* | Mar. 9 |
| *Works and Materials, Shorncliffe Sub-District | War Department | do. | do. |
| *Works and Materials | Metropolitan Asylum Board | do. | Mar. 10 |
| Restoration of Parish Church, Hilton, near Blandford | | W. Fletcher | Mar. 14 |
| Wesleyan Chapel and Schools, Park-view, Guiseley | | Herbert Isitt | No date |
| Two Villas, Usk | Mr. Boulton | | do. |
| New Buildings, Blackett-street, Newcastle-on-Tyne | Thomas Cooke | Jas. T. Cackett | do. |
| New Premises, Battle Hill, Hexham | Dr. T. Stainthorpe | Henry Grieves | do. |
| Miners' Hall, Institute, &c. Usworth Colliery, Co. Durham | | Davidson & Bendle | do. |
| Bishop Lightfoot Memorial Church, Gateshead | | Stephen Piper | do. |
| Rebuilding Workshop, Victoria-road, Leeds | Wilson Bros. | | do. |
| 15 Cottages, Hunslet, Leeds | Clayton, Son, & Co. Lim. | | do. |
| Wesleyan Chapel, Cudworth, Oldham | | Dixon & Taylor | do. |
| Cast Iron Rising Main, &c. | Wolstanton & Burslem, R.S.A. | Geo. B. Ford | do. |
| *Various Works, Kidsgrove, Staffs. | Clough Hall Park, &c. Co. Lim. | Jas. Stevens | do. |

## PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Salary | Applications to be in |
|---|---|---|---|
| *Second-class Assistant Surveyors | Civil Service Com. | Not stated | Feb. 6 |
| *Building Inspector | Hornsey Local Board | 3*l.* 3*s.* 0*d.* | Feb. 17 |
| *Surveyor | Stroud Local Board | 150*l.* | Feb. 18 |
| Sanitary Inspector | Camberwell Vestry | 250*l.* | Feb. 24 |
| *Assistant, City Surveyor's Department | Carlisle Corporation | 120*l.* | No date |

*Those marked with an Asterisk (*) are advertised in this Number.* *Competitions, p.* iv. *Contracts, pp.* iv., vi., *and* viii. *Public Appointments, p.* xx. *and* xxi.

LIVERPOOL ENGINEERING SOCIETY.—The sixth ordinary meeting of this society for the present session was held at the Royal Institution, Colquitt-street, on the 4th inst., Mr. Ferdinand Hudleston, Assoc.-M.Inst.C.E., President, in the chair.—Mr. Arthur J. Maginnis, M.I.N.A., exhibited and explained the mode of working of a new electric automatic bridge indicator for steamships.—Mr. Joseph Boult then read a paper entitled "Notes on the Phenomena of Tidal Rivers, with Special reference to the River Mersey." In the course of the paper, Mr. Boult dealt with the differences between tidal and non-tidal rivers, with the amount of tidal sea-water entering the Thames and the Mersey respectively, and the difference in tidal range between the West Coast of Britain and the East Coast of Ireland, and the cause of this difference. The various phases of the tides in the tidal channels at the mouth of the Mersey were next discussed, together with the numerous movements of the channels of the Upper Estuary. The Great Fret in the banks of the Upper Estuary was described, and conclusions drawn from the examination of the monthly Surveys showing the position of the navigable channel. The paper was brought to a conclusion with various suggestions for the improvement of the estuary of the river.

"BABYLONIA:" A NEW FIRE-RESISTING PAINT.—Messrs. Aspinall, of New Cross, who are so well-known for their "Enamel" paints, are introducing a new fire-resisting paint which is called "Babylonia." Judging by some experiments which we witnessed in the grounds of Ranelagh House, Fulham, on the 6th inst., it promises to be very useful in resisting a fire until aid can be summoned. It consists both of a paint and a "priming,"—the latter being transparent, and capable of being used for coating floors, doors, or other woodwork where it is not desired to conceal the grain of the wood. The paint and the "priming" can be used either singly or in conjunction. In the experiments which we witnessed, in fact, the test with the "Babylonia" paint-protected hut seemed, if anything, more successful than the test with the hut which was coated with both the priming and the paint. The two huts thus differently prepared, were roughly speaking, structures about 5 ft. wide by 6 ft. long, by 6 ft. 6 in. high, built of stout inch boards, in the one case painted, and in the other case primed and painted, inside and out. These huts so protected were tested with a third, of exactly the same size and construction, but painted inside and out with ordinary oil paint. One end of each hut was left quite open. The test applied consisted in burning a sack of shavings in each hut or receptacle. In little more than ten minutes the fires in each of the protected huts had quite spent themselves, and the woodwork remained intact. The structure of the third hut, however, was speedily in full blaze, and, after burning for more than an hour, was totally consumed. Other tests of the fire-resisting properties of "Babylonia" were made at the same time.

LONDON AND COUNTY BANKING COMPANY, LIMITED.—The report for the half-year ending December 31 last, adopted at the annual general meeting held on the 5th inst., shows that, after paying interest to customers and all charges, making provision for bad and doubtful debts, allowing 58,192*l.* 14s. 8d. for rebate on bills not due, and transferring 20,000*l.* in reduction of premises account, the net profits amount to 232,492*l.* 8s. 9d. This sum, added to 61,901*l.* 7s. 2d., the balance brought forward from last account, produces a total of 294,393*l.* 15s. 11d. The directors recommended the payment of a dividend of 11 per cent. for the half-year, which will absorb 220,000*l.* This will leave a balance of 74,393*l.* 15s. 11d. to be carried forward to profit and loss new account. The present dividend added to that paid to June 30 makes 22 per cent. for the year 1890. This bank joined to the extent of 750,000*l.* in the guarantee entered into by the Bank of England and other banks in regard to the affairs of Messrs. Baring Brothers & Co.

BRISTOL SOCIETY OF ARCHITECTS.—On the 9th inst., Mr. John Slater, B.A., of London, delivered a lecture to the members of the Bristol Society of Architects. Mr. Henry Crisp presided, and introduced Mr. Slater, who based his remarks on "Architectural Education." He pointed out that thirty years ago, if a man was a skilful draughtsman it was considered that he did not require much more to make him a good architect. Now, although there was a great tendency to disregard those things which their forefathers used and held in respect, there was an increasing conviction that the theories of the old Roman writer, Vitruvius, were not very wrong. Mr. Slater pointed out the danger architects were in of being crowded out by engineers, and spoke of the steps which were taken by the Royal Institute of British Architects in view of increasing the attention to the education and training of architects.

NEW STATUE, BRIDGERULE PARISH CHURCH.—An offering to the church of St. Bridget and St. Michael, Bridgerule, Devonshire, has just been made and has assumed the form of a statue of St. Bridget, carved in grey Polyphant stone—a material much used in the construction of the original church. Mr. Harry Hems, of Exeter, was commissioned to carry out the work, and this he has just completed. The new sculptured figure represents St. Bridget in the habit of an abbess, with a crozier in her left hand and a bunch of oak-leaves and acorns in the other.

SURVEYORS' INSTITUTION.—At the next meeting of this Institution, to be held on Monday evening next, a paper will be read by Mr. A. A. Hudson (Associate), entitled "Recent Legislation as to Buildings and Streets in London."

FREE LECTURES TO ARTISANS AT CARPENTERS' HALL.—The first of a series of free lectures to artisans and others was delivered on Wednesday evening last at the Carpenters' Hall, London-wall, by Professor H. Robinson, M.Inst.C.E., his subject being "Sanitary and Insanitary Dwellings." The chair was taken by Sir John Coode, K.C.M.G., and the lecture was listened to with evident interest by a large audience which filled every part of the hall.

STREET-CLEANING IN AMERICA.—The cost of cleaning the streets of New York is to be 1,584,250 dols. this year. The money appropriated for the purpose has been steadily increasing since the year 1882, when it was 1,010,000 dols. Last year the sum of 54,709 dols. was recovered by the sale of garbage and selected sweepings. In Baltimore a syndicate of business men of the city has proposed to perform all the duties of the street-cleaning department in a more effective manner than heretofore for 175,000 dols. per annum for five years. This is 100,000 dols. less than it cost the city in 1889. The syndicate offers satisfactory bond that it will carry out its contract, and expects to make a profit by help of the sale of refuse matter collected. The population of the city of Baltimore was between 300,000 and 400,000 when the tenth census was taken. Probably it now exceeds the latter figure.

## MEETINGS.

SATURDAY, FEBRUARY 14.

*Architectural Association.*—First Sessional Visit, to Messrs Hobbs's new buildings, Salisbury-street, Strand. 3 p.m.

*Royal Institution.*—The Right Hon. Lord Rayleigh, M.A., F.R.S., on "The Forces of Cohesion." I. 3 p.m.

*London Geological Field Class (Gresham College).*—Professor H. G. Seeley, F.R.S., on "The Gravel Beds of the Thames and its Tributaries in relation to Ancient and Modern Civilisation." II. 4.15 p.m.

MONDAY, FEBRUARY 16.

*Royal Institute of British Architects.*—Mr. J. Starkie Gardner on "Wrought-Iron Work: The Mediæval Period." 8 p.m.

*Surveyors' Institution.* — Mr. A. A. Hudson on "Recent Legislation as to Buildings and Streets in London." 8 p.m.

*Society of Arts (Cantor Lectures).*—Mr. Gisbert Kapp on "The Electric Transmission of Power." I. 8 p.m.

*University College (Archæology).*—Mr. W. St. Chad Boscawen on "Babylonian Archæology and Art." V. 5 p.m.

*Liverpool Architectural Society.*—Paper by Mr. H. W. Keef, entitled "A Ramble to Rome." 7 p.m.

*Leeds and Yorkshire Architectural Society.* — Mr. J. S. Corder, on "The Timber-framed Buildings of East Anglia." 7.30 p.m.

TUESDAY, FEBRUARY 17.

*Institution of Civil Engineers.*—Further Discussion on Messrs. Llewelyn B., and Claude W. Atkinson's paper on "Electric Mining-Machinery." 8 p.m.

*Sanitary Institute (Lectures for Sanitary Officers).*—Professor W. H. Corfield, M.A., on "Sanitary Appliances." 8 p.m.

*Statistical Society.*—Dr. Arthur Newsholme on "The Vital Statistics of Peabody Buildings and other Artisans' and Labourers' Block Dwellings." 7.45 p.m.

*Manchester Architectural Association.*—Mr. J. A. Gotch on "The Renaissance in Northamptonshire." 7.30 p.m.

*Glasgow Architectural Association.*—Mr. G. S. Aitken, F.S.A., Scot., on "Architecture in Relation to Social Problems." 8 p.m.

WEDNESDAY, FEBRUARY 18.

*Free Lectures to Artisans and others on Matters Connected with Building.*—Professor T. Roger Smith on "Failure of Buildings." Carpenters' Hall, London-wall. 8 p.m.

*Society of Arts.*—Colonel Sir Charles Wilson, F.R.S., on "Methods and Processes of the Ordnance Survey." 8 p.m.

*Civil and Mechanical Engineers' Society.*—Mr. M. Vinning on "High Pressure Fire Mains." 7 p.m.

*British Archæological Association.*—1. Dr. Alfred C. Fryer on "Discoveries at Mitchelsdean." 2. Mr. H. S. Cuming, F.S.A. (Scot.), on "Syllabub and Syllabub Vessels." 3. Mr. A. Oliver on "Ancient Brasses in the City of London." 8 p.m.

THURSDAY, FEBRUARY 19.

*Society of Antiquaries.*—8.30 p.m.

FRIDAY, FEBRUARY 20.

*Architectural Association.*—Messrs. G. C. Horsley and T. R Spence on "Marble and Mosaic." 7.30 p.m.

*Sanitary Institute (Lectures for Sanitary Officers).*—Mr. J. Wright Clarke on "Details of Plumbers' Work." 8 p.m.

*Royal Institution.*— Dr. E. M. Klein, F.R.S., on "Infectious Diseases, their Nature, Cause and Mode of Spread." 9 p.m.

*Society of Arts (Popular Afternoon Lectures).*—Captain Abney, F.R.S., on "The Science of Colour." 4.30 p.m.

*Junior Engineering Society.*—(1) Mr. J. B. Ball, on "Carriage-way Pavements in Large Towns and Cities." (2) Mr. A. Wollheim, on "The Design and Construction of Sewage Precipitation Works." 8 p.m.

*Institution of Civil Engineers.*—Students' Visit to the Tower Bridge Works, Tower-hill, E. 2 p.m.

SATURDAY, FEBRUARY 21.

*Royal Institution.*—The Right Hon. Lord Rayleigh, M.A., F.R.S , on "The Forces of Cohesion." II. 3 p.m.

*London Geological Field Class (Gresham College).*—Professor H. G. Seeley, F.R.S., on "The Gravel Beds of the Thames and its Tributaries in relation to Ancient and Modern Civilisation." III. 4.15 p.m.

*Edinburgh Architectural Association.* — Visit to Register House.

## RECENT PATENTS:

### ABSTRACTS OF SPECIFICATIONS.

18,609.—DRYING BRICKS: *J. Bond.*—The waste heat and gases escaping from the boiler flue and exhaust steam, is, according to this invention, collected and concentrated by means of a flue and radiators. Then, with great circulating force, the heat is carried entirely through the drying chambers, the circulation carrying at the same time all steam and moisture arising from the materials to be dried.

579.—TESTING AND REPAIRING DRAIN-PIPES: *W. Reynor.*—In order to prevent the trouble of taking up floors, the joints are, according to this invention, made good by pressing Portland cement through a U-shaped tube by pistons.

3,221.—FLUSHING APPARATUS: *W. H. Hawkins.*—An air-tight tank or cistern of suitable size and shape has a supply-valve fitted at the bottom and the same fittings also contains the discharge-valve. As water flows into the tank the air is compressed to a pressure corresponding with that in the main; on the discharge-value being opened the water is forcibly ejected, and the water having escaped the discharge-valve drops into the seat and the tank refills. The chief advantage is that no ball-tap or fittings of any kind are required inside the tank.

6,237.—WINDOW SASHES: *T. Jones.*—According to this patent, mechanical appliances are arranged within the window-frame for suspending, locking, fastening, and unfastening the sashes. The sashes have no weights, but slide up and down by means of rack and pinion gear.

14,597.—WINDOW SASHES: *T. Carn.*—In order that the sashes may be readily reversed, the sash is mounted on side pivots, supported in sliding bars working in the grooves of the window-frame, so that the sash can be swung on its pivots free of the beads of the frame. The laths and sash are locked together so that in their normal position they all move up and down as one. This is effected by tongues inserted in matching grooves.

17,782.—FLOORING OR WALL-COVERING: *H. Silver and others.*—According to this invention an article of manufacture, designed as a substitute for wall-paper, flooring &c., is made of two or more strips of thin wood veneer cemented on a backing of cloth or paper. It is made either flat or corrugated as desired.

18,459.—FIRE AND WEATHER-PROOF ROOFING: *C. S. Haensler (Germany)*—Very elaborate directions are given for the construction of roofs of timber with layers of cement and paper covered over with a layer of coal-ashes finely sifted or fine sand.

18,468.—ARTIFICIAL STONE: *Fr. Jurschina and R. Von Ritter (Germany).*—The composition is a mixture of more or less finely-ground quartz sand or flint gravel, Tripoli and Portland, made with a solution of soda, water, and glass into a paste or plastic mass that can be pressed or cast in moulds.

19,141.—DOOR-HINGES: *H. Faulhaber.*—The door is provided with a device comprising a pivot mounted on a slide or foot-plate, which is slid into and secured on the door by means of screws.

### NEW APPLICATIONS FOR PATENTS.

*January* 26.—1,403, C. Pfister and J. Schmidt, Flushing Cisterns.—1,429, B. Edwards, Latch.

*January* 27.—1,433, A. Thomas, Sash Fasteners.—1,435, W. Bodin, Flushing Apparatus.—1,449, A. Ward, Fireproof-floors, Staircases, and Roofs.—1,469, E. Leon, Water-closets.—1,471, J. Henderson, Window-sashes and Frames.

*January* 28.—1,529, E. Drummond, Fastening Door-knobs or Handles to Spindles.—1,553, W. Jackson, Movable Decorated Door-panels.

*January* 29.—1,601, T. Whittaker, Presses for making and pressing Bricks, Tiles, &c.—1,617, J. Garrett, Kiln for burning Portland Cement, &c.—1,627, R. Foulkes and others, Fixing Tiles in Fire-grates, &c.—1,632, T. Tulloch, Glazing without Sash-bars or putty.—1,666, B. Mädler, Door Cheeks.

*January* 30.—1,698, C. Duffield, Tunnelling.—1,747, J. Bowles, Saws. —1,750, C. Forell, Artificial Roman Cement.

*January* 31.—1,767, J. Trick, Lock Ventilating Sash-fastener. —1,816, H. De Lastelle, Construction of Buildings.—1,834, W. Horn, Screen Door.

### PROVISIONAL SPECIFICATIONS ACCEPTED.

19,975, A. Clifford, Ventilators for Chimneys.—20,151, T. Hollies, Sash or Door Fastener.—201, W. Hyland and W. Clissord, Locking Sash-frames and Preventing them from Rattling.—20,321, J. Swann, Cowl or Ventilator.—20,717, J. Chorlton and G. Scott, Step-ladders.—20,763, A. Attwood and R. Jackson, Revolving Wood Shutters.—21,150, H. Haes, Levelling Staves.—418.—T. Armitage, Sign Boards.—462, A. Binnie, Stoves and Fireplaces.—548, G. Lyons, Sliding Windows.—570, T. Davey, Metal facing.—716, C. Vasmer, Ventilating and Heating Rooms.—789, J. Gibson, Window Sashes, Frames, &c.—832, J. Martin, Raising and Lowering Sash Windows.—839, A. Hunter, Sash Lifter and Fastener for Windows.—900, W. Wade, Tiles.—1,115, W. Taylor, Manufacture of Cement.

### COMPLETE SPECIFICATIONS ACCEPTED.

*Open to Opposition for Two Months.*

2,223 and 2,244, J. Rendle, Glass Roofing.—3,985, G. Moller, Kilns for Burning Bricks, &c.—4,718, A. Govan, Hanging Window-sashes.—4,738, S. Haslam, Window Sash and Frame.—4,785, A. Stalker and another, Valves for Water-closet and other cisterns.—5,899, T. Robinson, Wood-planing and Moulding Machines.—11,893, A. and J. Tilton, Sash Movements without cords or weights.—20,251, L. Trevisaro, Furnaces for Burning Bricks, &c.

## SOME RECENT SALES OF PROPERTY:

### ESTATE EXCHANGE REPORT.

FEBRUARY 3.—By *F. Jolly & Co:* 92, High-st., Plaistow, u.t. 68 yrs., g.r. 5*l.*, r. 45*l.*, 500*l.*; 158, Packington-st., Islington, u.t. 45 yrs., g.r. 7*l.*, 500*l.*; 155, Ferndale-rd., Brixton, u.t. 60 yrs., g.r. 7*l.* 10s., r. 28*l.*, 205*l.*

FEBRUARY 5.—By *Beard & Son:* 3, Clydesdale-rd., Bayswater, f., rates 17*l.* 10s., r. 65*l.*, 570*l.*; 37 and 39, Colville-gardens, u.t. 95 yrs., g.r. 76*l.*, r. 406*l.*, 2,600*l.*; Colville Sq.-mews, f.g.r. of 30*l.*, with reversion in 76 yrs., 730*l.*; Nos. 1 to 4, Colville Sq.-ter., f., 2,500*l.*; 1, Colville Houses, f., 685*l.*; 132 and 134, Portsdown-mansions, Maida Vale, u.t. 68 yrs., g.r. 42*l.*, 2,100*l.*—By *Foster & Cranfield:* 30, Chapel-street, Islington, u.t. 22 yrs., g.r. 24*l.*, r. 60*l.*, 310*l.*; 50, Lamb's Conduit-st., Russell-sq., u.t. 72 yrs., g.r. 15*l.*, r. 100*l.*, 1,460*l.*; Thurlow-pl., South Kensington, i.g.r. of 29*l.* 10s., u.t. 31 yrs., g.r. 10*l.*, 310*l.*; 43 and 45, Darnley-rd., Hackney, u.t. 46 yrs., g.r. 15*l.*, 605*l.*; 10, Angel-ct., Strand, an improved rent of 43*l.*, u.t. 3¼ yrs., 10*l.*

[*Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

## PRICES CURRENT OF MATERIALS.

| TIMBER. | | |
|---|---|---|
| Greenheart, B.G. | ton | 6/15/0 7/5/0 |
| Teak, E.I... load | | 10/0/0 13/0/0 |
| Sequoia, U.S.ft.cu. | | 2/3 3/0 |
| Ash, Canada load | | 2/10/0 4/5/0 |
| Birch, do. ..... | | 2/5/0 4/5/0 |
| Elm, do. ..... | | 3/10/0 4/15/0 |
| Fir, Dantsic, &c. | | 2/0/0 3/15/0 |
| Oak, do. ..... | | 2/10/0 4/10/0 |
| Canada..... | | 4/17/6 6/10/0 |
| Pine, Canada red | | 2/10/0 3/10/0 |
| Do, yellow .... | | 2/0/0 5/10/0 |
| Lath, D'ntsic, fath | | 5/0/0 6/0/0 |
| St. Petersburg | | 5/0/0 7/0/0 |
| Deals, Finland, 2nd & 1st std | ton | 7/10/0 10/0/0 |
| Do, 4th & 3rd.. | | 7/0/0 7/5/0 |
| Do. Riga ..... | | 6/0/0 8/0/0 |
| St. Petersburg, 1st yellow .. | | 9/10/0 14/10/0 |
| Do. 2nd yellow | | 7/10/0 9/0/0 |
| Do. white .... | | 7/0/0 10/0/0 |
| Swedish ..... | | 7/0/0 15/10/0 |
| White Sea .... | | 8/0/0 17/0/0 |
| Canada, Pine 1st | | 13/0/0 24/0/0 |
| Do. do. 2nd.... | | 9/0/0 16/0/0 |
| Do. do. 3rd, &c. | | 7/0/0 10/0/0 |
| Do. Spruce. 1st | | 8/10/0 10/10/0 |
| Do. do. 3rd & 2nd..... | | 6/10/0 8/0/0 |
| New Brunswick | | 5/10/0 7/10/0 |
| Battens, all kinds | | 4/10/0 15/10/0 |
| Flooring Boards, sq., 1 in. prep. 1st ..... | | 0/10/0 0/14/0 |
| Do. 2nd..... | | 0/8/0 0/10/6 |
| Other qualities | | 0/5/6 0/7/9 |
| Cedar, Cuba ..ft. | | /4 /5 |
| Honduras, &c. | | /3½ /4½ |
| Mahogany, Cuba. | | /4½ /6½ |
| St. Domingo, cargo av | | /4½ /6½ |
| Mexican do. do | | /4½ /5½ |
| Tobasco do. do | | /5½ /6½ |
| Honduras do.. | | /5½ /6½ |
| Box, Turkey | ton | 4/0/0 13/0/0 |
| Rose, Rio..... | | 12/0/0 19/0/0 |
| Bahia ..... .. | | 10/0/0 18/0/0 |

| TIMBER (*continued*). | | |
|---|---|---|
| Satin, St. Domingo .....ft. | | 0/0/9 0/1/3 |
| Porto Rico .... | | 0/0/10 0/1/6 |
| Walnut, Italian.. | | 0/0/4 0/0/7 |
| **METALS.** | | |
| IRON—Bar, Welsh, in London..ton | | 6/5/0 6/15/0 |
| Do. do. at works in Wales ..... | | 5/15/0 6/5/0 |
| Do. Staffordshire, in London .... | | 6/5/0 7/0/0 |
| COPPER—British, cake and ingot | | 56/0/0 57/0/0 |
| Best selected .. | | 59/0/0 60/0/0 |
| Sheets, strong.. | | 66/0/0 0/0/0 |
| Chili, bars .... | | 52/10/0 0/0/0 |
| YELLOW METAL | lb. | 0/0/6 0/0/6¼ |
| LEAD—Pig, Spanish....ton | | 12/10/0 0/0/0 |
| English, com. brands ..... | | 12/10/0 12/12/6 |
| Sheet, English, 3 lbs. per sq. ft. and upwards .. | | 14/10/0 15/0/0 |
| Pipe ..... | | 15/0/0 0/0/0 |
| ZINC—English sheet .....ton | | 27/10/0 0/0/0 |
| Vieille Montagne..... | | 28/5/0 0/0/0 |
| TIN—Straits .... | | 90/10/0 0/0/0 |
| Australian .... | | 90/15/0 0/0/0 |
| English ingots | | 94/10/0 0/0/0 |
| **OILS.** | | |
| Linseed .....ton | | 21/17/6 22/2/6 |
| Cocoanut, Cochin | | 35/0/0 0/0/0 |
| Do. Ceylon ..... | | 29/0/0 0/0/0 |
| Palm, Lagos .... | | 25/10/0 26/0/0 |
| Rapeseed, English pale ..... | | 28/15/0 0/0/0 |
| Do. brown ..... | | 27/0/0 27/5/0 |
| Cottonseed ref... | | 18/15/0 0/0/0 |
| Oleine ..... | | 22/0/0 24/0/0 |
| Lubricating, U.S. | | 6/0/0 7/0/0 |
| Do. refined ..... | | 7/10/0 12/0/0 |
| TAR—Stockholm | barrel | 1/1/6 1/2/0 |
| Archangel .... | | 0/14/6 0/0/0 |

## TENDERS.

[Communications for insertion under this headin must reach us *not later than* 12 *noon on Thursdays.*]

ASHTON-UNDER-LYNE.—For the erection of a Free Library and Technical School. Messrs. John Eaton & Sons, architects, Stamford-street, Ashton-under-Lyne. Quantities by Mr. H. E. Metcalf:—

| | |
|---|---|
| Allen Holmes, Ashton-under-Lyne (accepted).. | £10,585 0 0 |

BARKING.—For the construction of a weir, &c., at the Barking Outfall Sewage Works, for the London County Council. Mr. A. R. Binnie, Engineer:—

| | | | |
|---|---|---|---|
| Mowlem & Co. ..... | £4,037 0 | Munday & Son ..... | £1,890 4 |
| G. Bell ..... | 2,514 0 | | |

BOURNEMOUTH—For supplying, erecting, and setting to work engines, pumps, boilers, &c., &c., for the Sea-Water scheme of the Bournemouth Town Council. Mr. F. W. Lacey, Borough Surveyor:—

| | |
|---|---|
| A. B. Dawnay..... | £2,745 10 0 |
| F. F. Reynolds & Co..... | 2,605 19 0 |
| Goddard, Massey, and Warner, Nottingham* .. | 2,515 7 0 |

* Accepted.

BRENTFORD.—For repairing and finishing thirteen cottages at Brentford:—

| | |
|---|---|
| P. & H. Lawrie (accepted) ..... | £303 0 0 |

BURSLEM.—For making, paving, &c., several streets (Grittonstreet, Derby-street, Reid-street, &c.) for the Corporation. Mr. F. Bettany, Borough Engineer, St. John's-chambers, Burslem:—

*Derby-street.*

| | |
|---|---|
| Smith & Taylor, Basford, Stoke-on-Trent (accepted) | £299 0 0 |

*Paving Back Hall, Riley, and Lyndhurst-street.*

| | |
|---|---|
| W. Grant, Burslem (accepted)..... | £112 0 0 |

CARLISLE.—For the work required in ten new houses, in Morley street, for Mr. J. J Fearnley. Mr. H. H. Hodgkinson, architect, 33, Bank-street, Carlisle:—

| | |
|---|---|
| J. & R. Bell (Builder) ..... | £990 0 0 |
| J. Hindson (Joiner)..... | 353 0 0 |
| J. Harrington (Plasterer) ..... | 113 0 0 |
| J. Smith (Slater) ..... | 94 4 7 |
| W. J. Wilson (Plumber)..... | 67 7 6 |
| J. Allan (Painter)..... | 29 18 6 |
| J. Edmondson (Ironfounder) ..... | 17 0 0 |

[All of Carlisle].

CARLISLE.—For the erection of three cottages in South-street:—

| | |
|---|---|
| James Hewitt, Carlisle (accepted) ..... | £496 0 0 |

CHERTSEY.—Accepted for levelling, metalling, channelling, &c., several streets at Chertsey, Addlestone, Hersham, and Oatlands, for the Rural Sanitary Authority. Mr. W. Durrant, surveyor, Addlestone:—

| | |
|---|---|
| *Victoria-road*—James Martin, Addlestone..... | £159 0 0 |
| *Albert-road*—William Bolton, Addlestone..... | 133 10 0 |
| *Ecton-road*—James Martin, Addlestone..... | 115 0 0 |
| *Highfield-road*—G. A. Franks, Guildford ..... | 104 16 4 |
| *Masonic Hall-road*—Wm. Hebburn, Worplesdon | 94 9 0 |
| *Albany-road*—William Hebburn, Worplesdon .... | 242 10 0 |
| *Part of Vale-road*—Wm. Hebburn, Worplesdon.. | 56 5 0 |

FARNHAM.—For paving works (three contracts), for the Farnham Local Board. Mr. R. F. Hankins, Surveyor, Farnham. Quantities by Mr. R. F. Hankins:—

*Contract No.* 1.

| | |
|---|---|
| R. Chamberlain, Farnham ..... | £504 12 0 |

*Contract No.* 2.

| | |
|---|---|
| Victoria Stone Company, London ..... | 262 10 0 |

*Contract No.* 3.

| | |
|---|---|
| R. Chamberlain, Farnham ..... | 42 10 0 |

[All accepted].

FENTON (Staffs).—For the erection of a chapel. Messrs. Whincop & Perkin, architects, 44, Norcott-road, Stoke Newington, N.:—

| | | | |
|---|---|---|---|
| J. T. Clark..... | £1,693 12 0 | Tompkinson & Belleley | £1,497 0 0 |
| Multon & Wallis .... | 1,669 0 0 | Embrey ..... | 1,427 0 0 |
| Godwin ..... | 1,639 0 0 | C. Cornes, Hanley*.. | 1,415 0 0 |
| Leonard Price ..... | 1,538 3 0 | H. Godwin..... | 1,379 0 0 |

*Seating.*

| | |
|---|---|
| C. Cornes, Hanley* ..... | £135 0 0 |

* Accepted.

GRAVESEND.—For the erection and completion of new Public Hall at Gravesend. Mr. John Johnson, architect:—

| | | | |
|---|---|---|---|
| Higgs ..... | £3,100 0 0 | J. O Richardson.... | £2,609 0 0 |
| J. W. Falkner..... | 2,995 0 0 | Balaam ..... | 2,575 0 0 |
| Stimpson ..... | 2,880 0 0 | Archer ..... | 2,570 0 0 |
| W. Tuffee ..... | 2,689 0 0 | Hill (accepted)..... | 2,490 0 0 |
| Multon & Wallis.... | 2,676 0 0 | | |

HANLEY (Staffs.). — For the erection of school buildings at Glass-street for 700 children, for the School Board. Mr. Edward E. S rivener, architect, Howard-place, Hanley. Quantities by the architect:—

| | | | |
|---|---|---|---|
| — Robinson ..... | £6,700 | C. Cornes ..... | £5,675 |
| G. Ellis ..... | 6,480 | Bradley & Co. ..... | 5,630 |
| Osborne & Co. ..... | 6,450 | T. Godwin, Hanley *..... | 5,487 |
| H. & R. Inskip..... | 6,057 | J. T. Clarke ..... | 5,412 |
| N. Bennett ..... | 5,699 | | |

* Accepted.

KINGTON (Herefordshire).—For sewering the town and constructing tanks, for the Kington Urban Sanitary Authority. Mr. R. L. Bamford, engineer, 138, Widemarsh-street, Hereford:—

| | | | |
|---|---|---|---|
| Perrin & Long ..... | £2,798 17 0 | J. Williams ..... | £1,401 7 4 |
| C. Edwards ..... | 1,605 0 0 | Geo. Law, Kidderminster (accepted). | 1,341 12 0 |
| H. Welsh ..... | 1,543 0 0 | | |
| H. Millward..... | 1,403 2 6 | | |

LEEDS. — For the erection of two houses, in Broadgate-lane Horsforth. Mr. C. Fred. Wilkinson, architect, 35, Park-square Leeds:—

| | |
|---|---|
| *Mason and Brickwork*—Smith Naylor, Horsforth | £340 0 0 |
| *Carpenter and Joiner*—J. Jakeman, Leeds ..... | 236 10 0 |
| *Slaters*—J. Atkinson & Son, Leeds..... | 29 15 0 |
| *Plasterer*—J. Walsh, Armley ..... | 56 7 0 |
| *Plumber and Painter*—Geo. Thompson, Leeds.... | 69 10 0 |
| | 732 2 0 |

LONDON.—For the erection of new premises at King's-cross, for Messrs. Thorley. Mr. Fred Pinches, architect, 5, John-street, Adelphi. Quantities by Mr. A. J. Turner, 1, Tudor-street, E.C.:—

| | | | |
|---|---|---|---|
| McLachlan ..... | £16,430 | Holloway Bros. ..... | £16,139 |
| Larter ..... | 16,425 | Killby & Gayford * ..... | 15,936 |
| G. S. S. Williams..... | 16,246 | | |

* Accepted.

LONDON.—For pulling down and rebuilding the "Northampton Arms," Goswell-road, E.C., for Mr. J. D. Spiers. Mr. H. I. Newton, architect, 49, Victoria-street, W.:—

| | | | |
|---|---|---|---|
| Mark ..... | £7,993 | Burman & Son..... | £7,400 |
| Mattock Bros. ..... | 7,877 | Lamble ..... | 7,252 |
| Godden ..... | 7,583 | Dearing & Son (accepted).. | 7,066 |
| Patman & Fotheringham.. | 7,523 | | |

LONDON.—For erecting new conveniences in Great Dover-street, for the Newington Vestry:—

| | | | |
|---|---|---|---|
| Frumpton ..... | £2,277 0 | Finch..... | £1,853 0 |
| Smeaton ..... | 2,050 0 | Stidder ..... | 945 18 |
| Burman ..... | 2,033 0 | | |

LONDON.—For structural alterations to "The Lord Craven" Hotel, Westbourne Park. Mr. Jas. Warne, architect, Montpelier-road, Peckham:—

Josolyne & Young, High-street, Borough (accepted) £360.

LONDON.—For constructing 18 in. pipe sewer, with manholes, flushing-tanks, &c., in Jockey's-fields, for the Holborn District Board of Works. Mr L. H. Isaacs, Surveyor :—

| | | | |
|---|---|---|---|
| J. Walker, Camden Town .. | £800 | J. Mowlem & Co. ..... | £715 |
| Rudd & Son ..... | 800 | C. W. Killingback & Co, Camden Town* ..... | 675 |
| W. Griffiths ..... | 784 | | |
| J. Neave ..... | 760 | | |

* Accepted.

LONDON.—For rebuilding Nos. 11 and 13, Homer-row, Marylebone, for Miss Craghill. Mr. Edmund J. Harrison, architect, 72, Chancery-lane, W.C. Quantities by architect :—

| | | | |
|---|---|---|---|
| F. Mark ..... | £819 | Lown & Sons..... | £785 |
| W. Goodman ..... | 794 | Ward & Lamble (accepted).. | 719 |

LONDON.—For new fifth story to Nos. 36 and 37, Newgate-street, for Messrs. Faudell Phillips & Co. Mr. C. W. Chapman, architect 10, Basinghall-street :—

| | | | |
|---|---|---|---|
| Taylor & Son ..... | £857 | Patrick & Son ..... | £833 |
| Bywaters ..... | 857 | Joselyne & Young (accepted) | 785 |

MORDEN (Surrey).—For the erection of lodge for new cemetery at Hobald's Farm, for the Burial Board for the Parish of St. Mary, Battersea. Mr. William C. Poole, architect, 62, Belleville-road, Wandsworth-common, S.W. :—

| | | | |
|---|---|---|---|
| Garrett & Son ..... | £1,300 | Batley..... | £1,125 |
| Flew & Co. ..... | 1,197 | Wallis ..... | 1,087 |
| Jarvis ..... | 1,163 | Horton* ..... | 1,084 |
| Chessum & Son ..... | 1,140 | | |

* Accepted.

[Architect's estimate, £1,050.]

ST. LEONARDS-ON-SEA.—For residence, Filsham Estate, for Mr. M. J. D. Stephens. Messrs. Elworthy & Son, St. Leonards-on-Sea, architects :—

| | | | |
|---|---|---|---|
| Boniface ..... | £2,612 | White ..... | £2,193 |
| C. & E. Harman ..... | 2,500 | Eldridge & Cruttenden.... | 2,190 |
| Salter ..... | 2,500 | Taylor Bros. ..... | 2,155 |
| Bovis ..... | 2,487 | Snow ..... | 2,124 |
| Jenkins ..... | 2,460 | Hughes (accepted) ..... | 2,116 |
| H. Cruttenden..... | 2,418 | T. Taylor ..... | 1,833 |

[Architects' estimate, £2,257.]

SHEFFIELD.—For the construction of a main brick-sewer from Darnall-road to Stainforth-road, for the Sewerage and Rivers Committee. Mr. G. Alsing, engineer, 108, Norfolk-street, Sheffield. Quantities supplied :—

| | | | |
|---|---|---|---|
| J. Rickerby ..... | £1,950 0 | Deardon & Jackson, Penistone-road, Sheffield (accepted)..... | £963 10 |
| B. Powell & Son..... | 1,500 0 | | |
| Scott & Ward ..... | 978 9 | | |

SOUTHAMPTON.—For the erection of a villa residence, Northlands-road, Southampton, for Lieut.-Colonel Henry Paterson. Mr. William Burrough Hill, architect Southampton :—

T. J. Jukes (accepted) ..... £1,350

SUDBOROUGH (Northamptonshire).—For the restoration of All Saints' Church, Sudborough. Mr. J. C. Traylen, architect, Stamford. Quantities by architect :—

| | | | |
|---|---|---|---|
| Roberts Bros. ..... | £1,357 0 | Halliday*. ..... | £1,234 15 |
| Thompson ..... | 1,346 0 | Roberts & Son, Weedon* | 1,228 16 |

* Accepted.

TOTNES.—For laying pipe-sewers and other work for the Town Council. Mr. W. F. Tollit, Borough Surveyor, Bridgetown, Totnes :—

| | | | |
|---|---|---|---|
| Sellwood ..... | £227 10 | Pike ..... | £220 0 |
| Fowden ..... | 223 0 | Shaddock ..... | 214 0 |
| Ash ..... | 218 0 | Vanstone, Paignton* .... | 158 0 |

* Accepted

TUNSTALL.—For mill-house, engine and boiler sheds and chimney stack, at the Bradwell Wood Tileries, for Messrs. Timmis & Sons. Mr. Edwin Penn, architect, Stoke-upon-Trent :—

H. Goodwin, Longton (accepted) ..... £522 0 0

WALLASEY.—For pulling down buildings, erecting boundary walls, and road-making, in widening Upper Brighton, for the Wallasey Local Board. Mr. A. Salmon, Surveyor, Public-offices, Egremont, Cheshire. Quantities supplied :—

| | | | |
|---|---|---|---|
| T. Tattarall & Co. .... | £400 0 0 | Jno. Povall, New Brighton (accepted) | £327 11 6 |
| J. W. Wilson ..... | 384 0 0 | | |
| Kellin Bros. ..... | 380 5 4 | | |

WEST HAM.—For alterations to boiler-house, &c., at Abbey Mills Sewage Pumping Station, for the London County Council. Mr. A. R. Binnie, Engineer :—

| | | | |
|---|---|---|---|
| Perry & Co..... | £11,012 0 0 | Munday & Son .... | £8,777 1 1 |
| Mowlem & Co. .... | 10,841 0 0 | W. Gregar ..... | 6,744 0 0 |

WOOLWICH.—For additions to the Submarine Cable Depôt, Trinity-street, Woolwich, S.E., for H.M. Office of Works. Mr. R. H. Boyce, architect :—

J. O. Richardson, Albert Works, Peckham, S.E.* .... £2,549

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## TO CORRESPONDENTS.

F. C. E (We cannot open our columns to what is in reality a theological discussion)—M. L. S—H. H.—C. G.—J. F. W. (Amounts should have been stated).—B. & Co. (ditto).—F. C. R. (received too late for this week ; shall have consideration).

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

*We cannot undertake to return rejected communications.*

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

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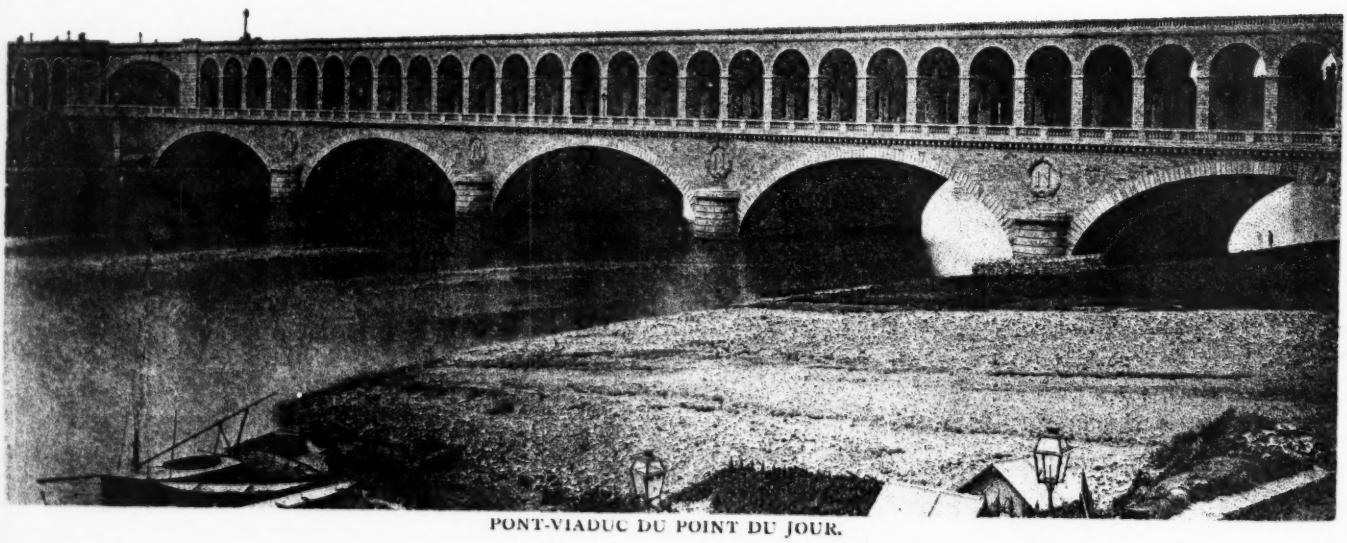

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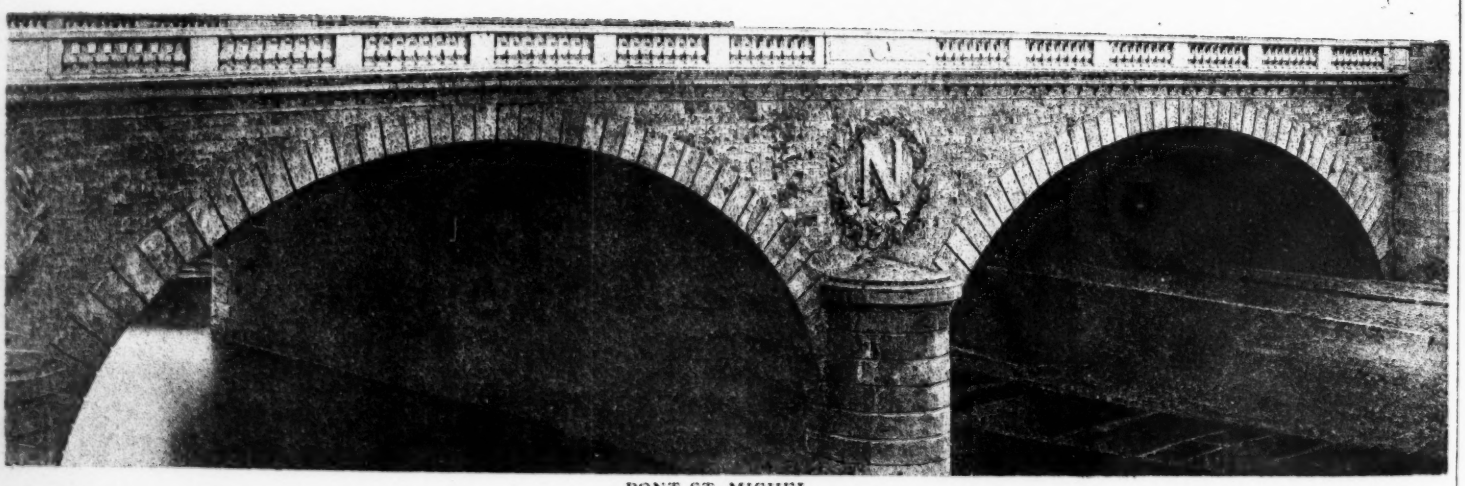

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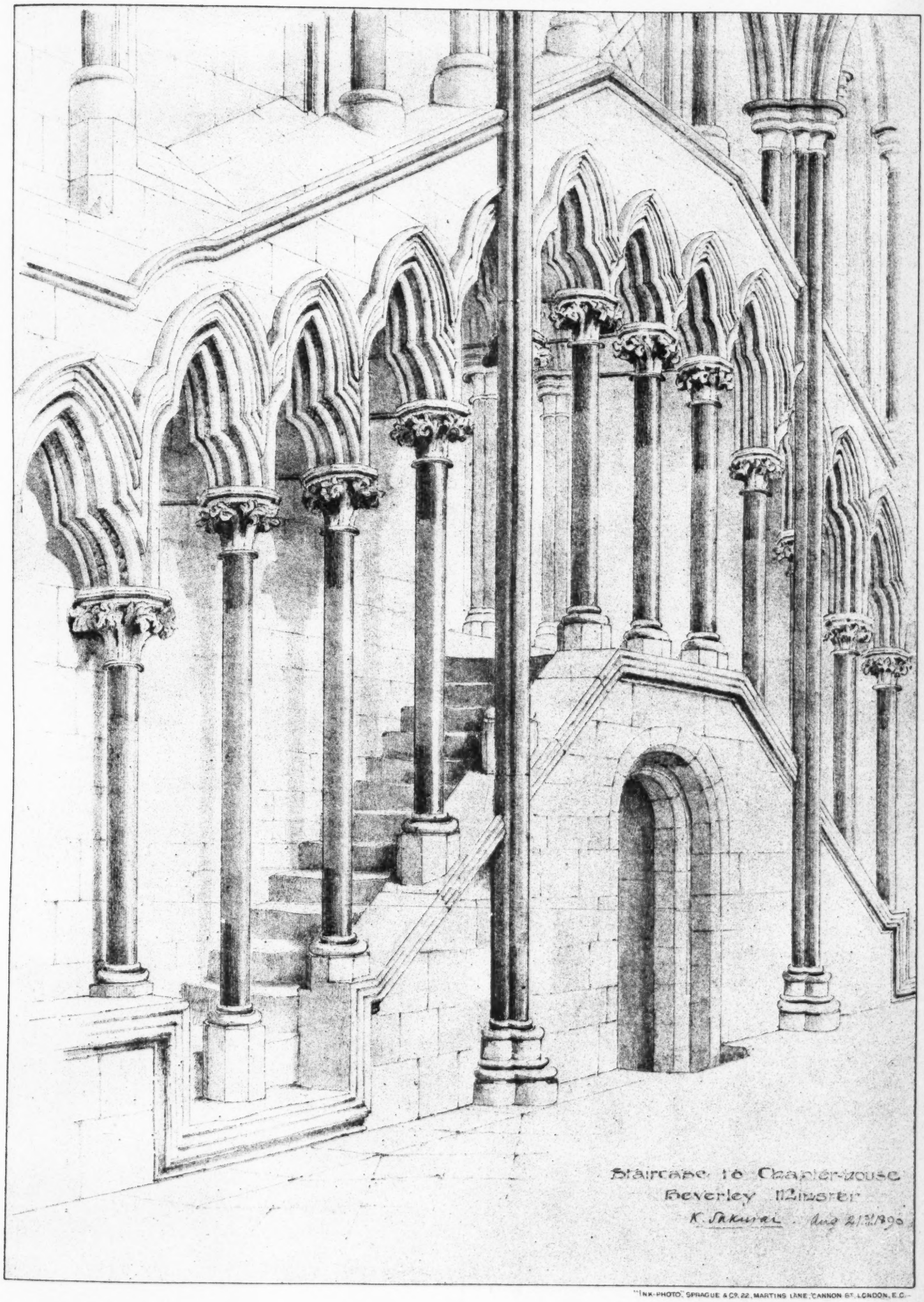


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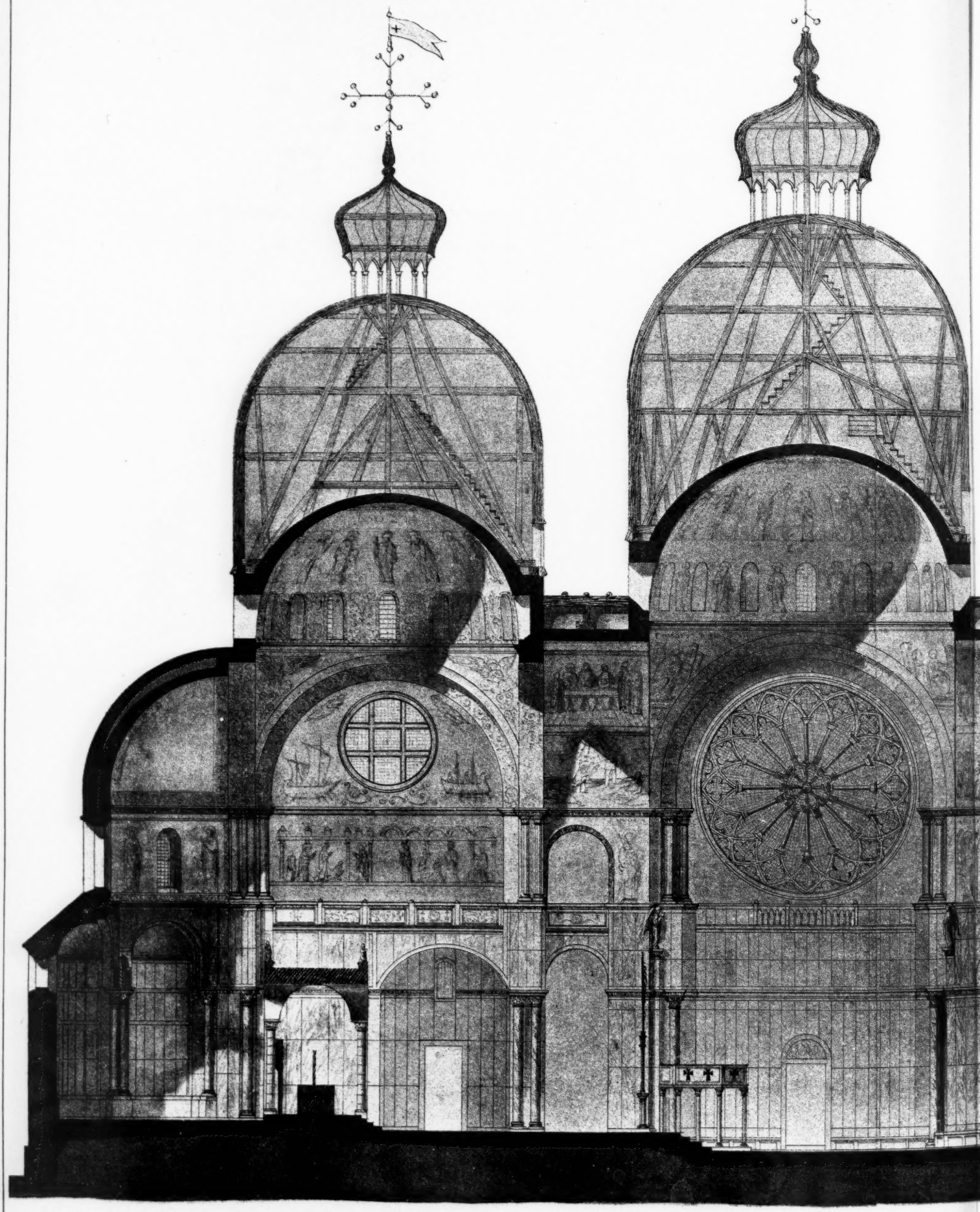

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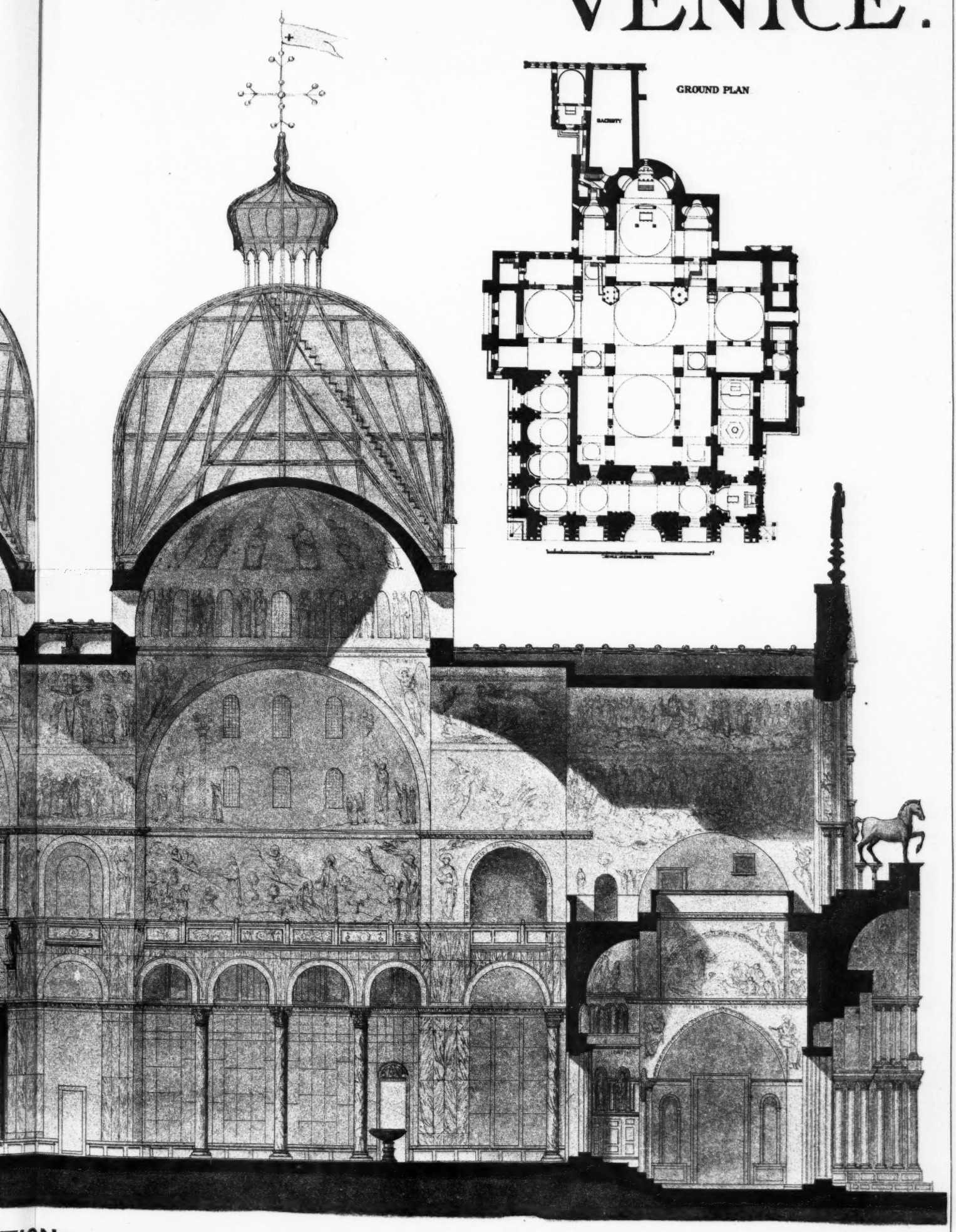




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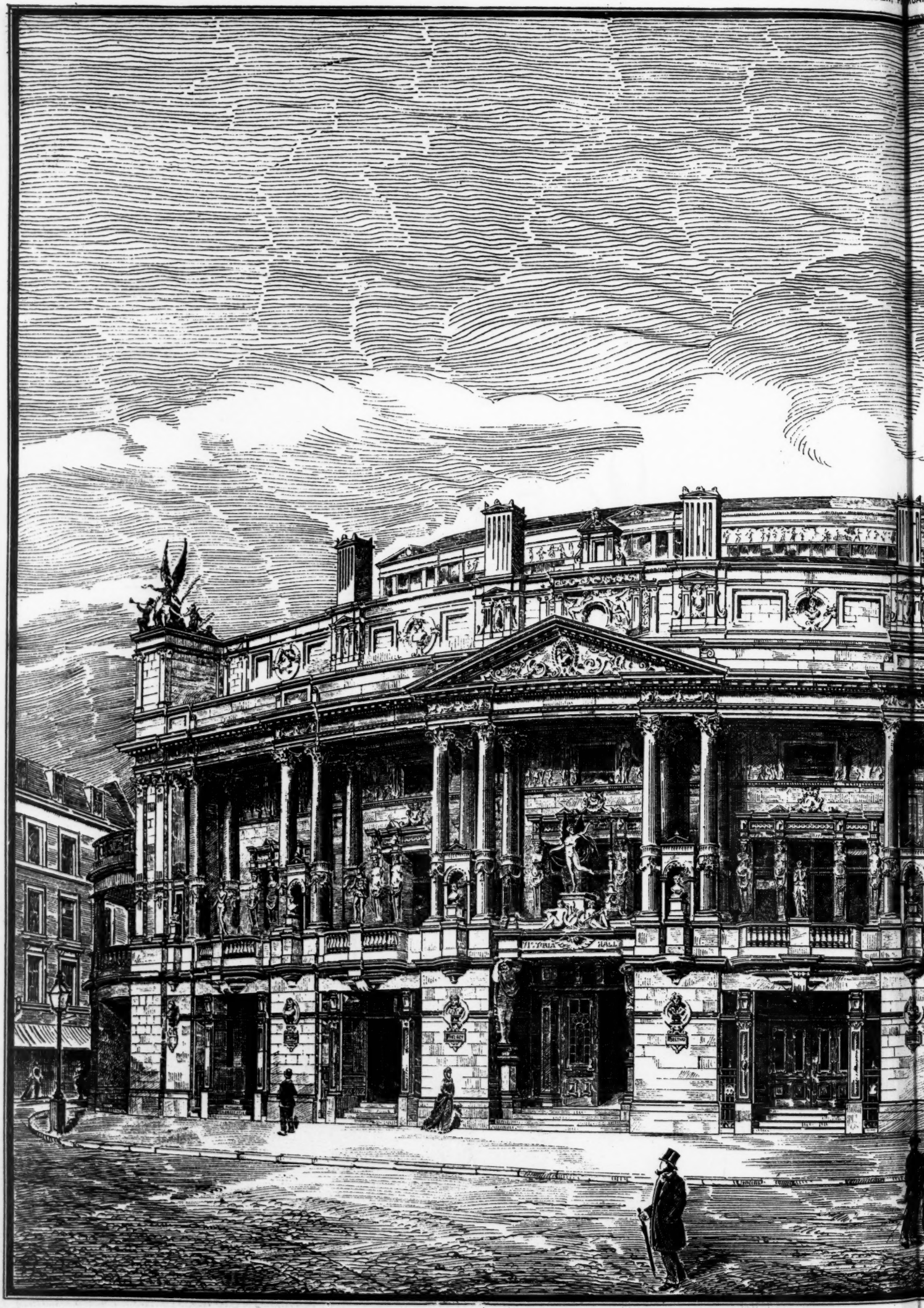


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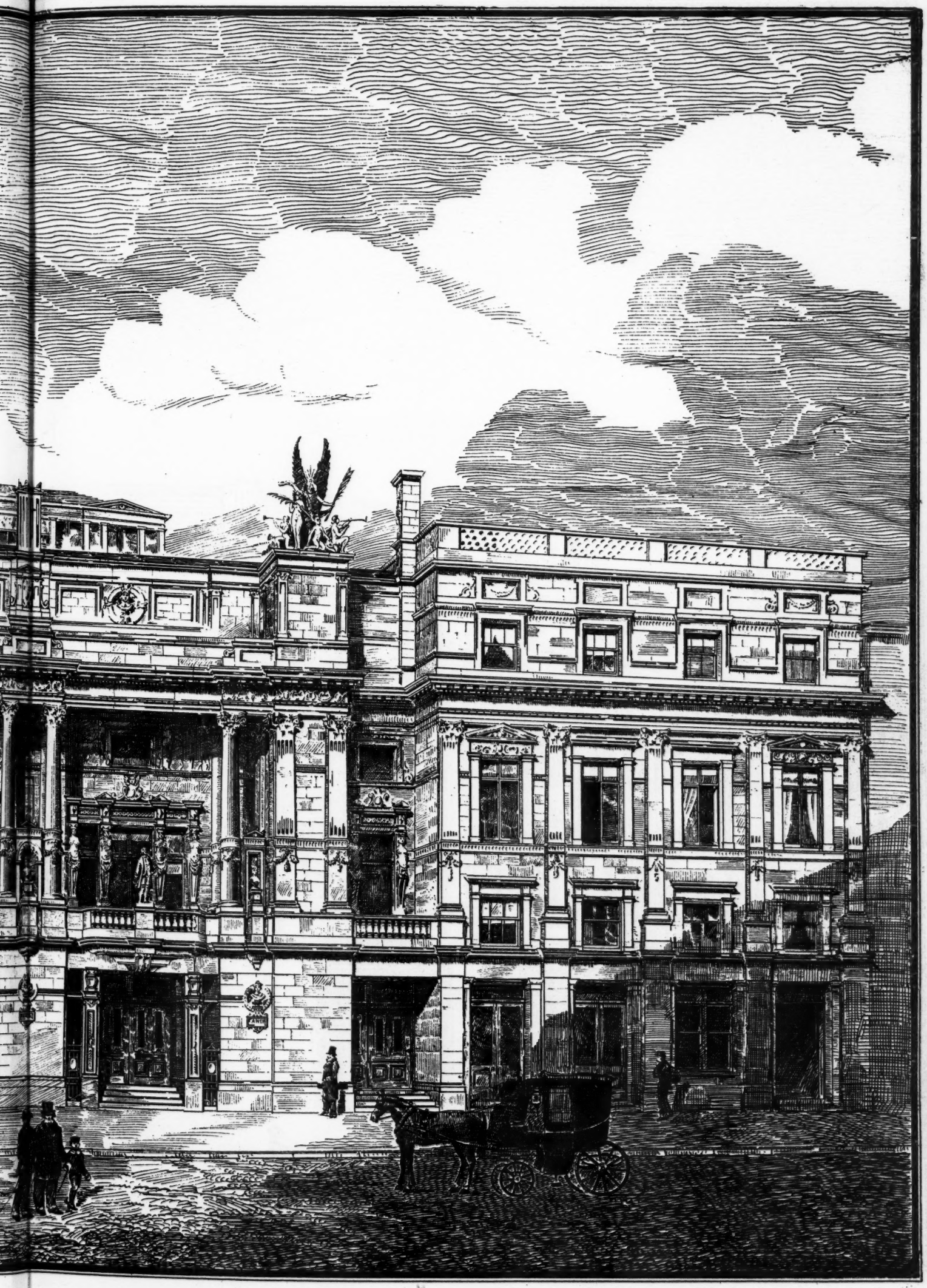

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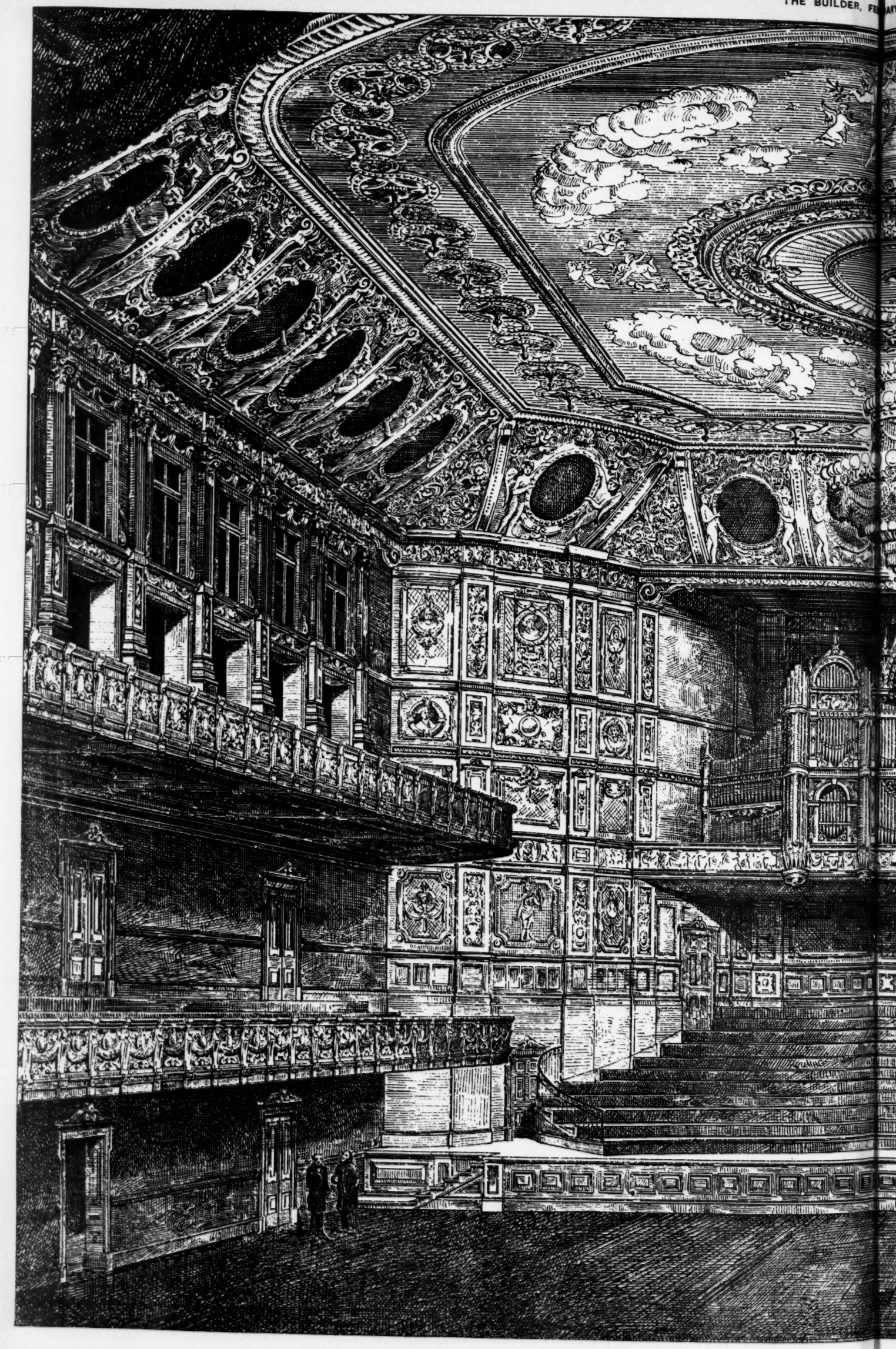

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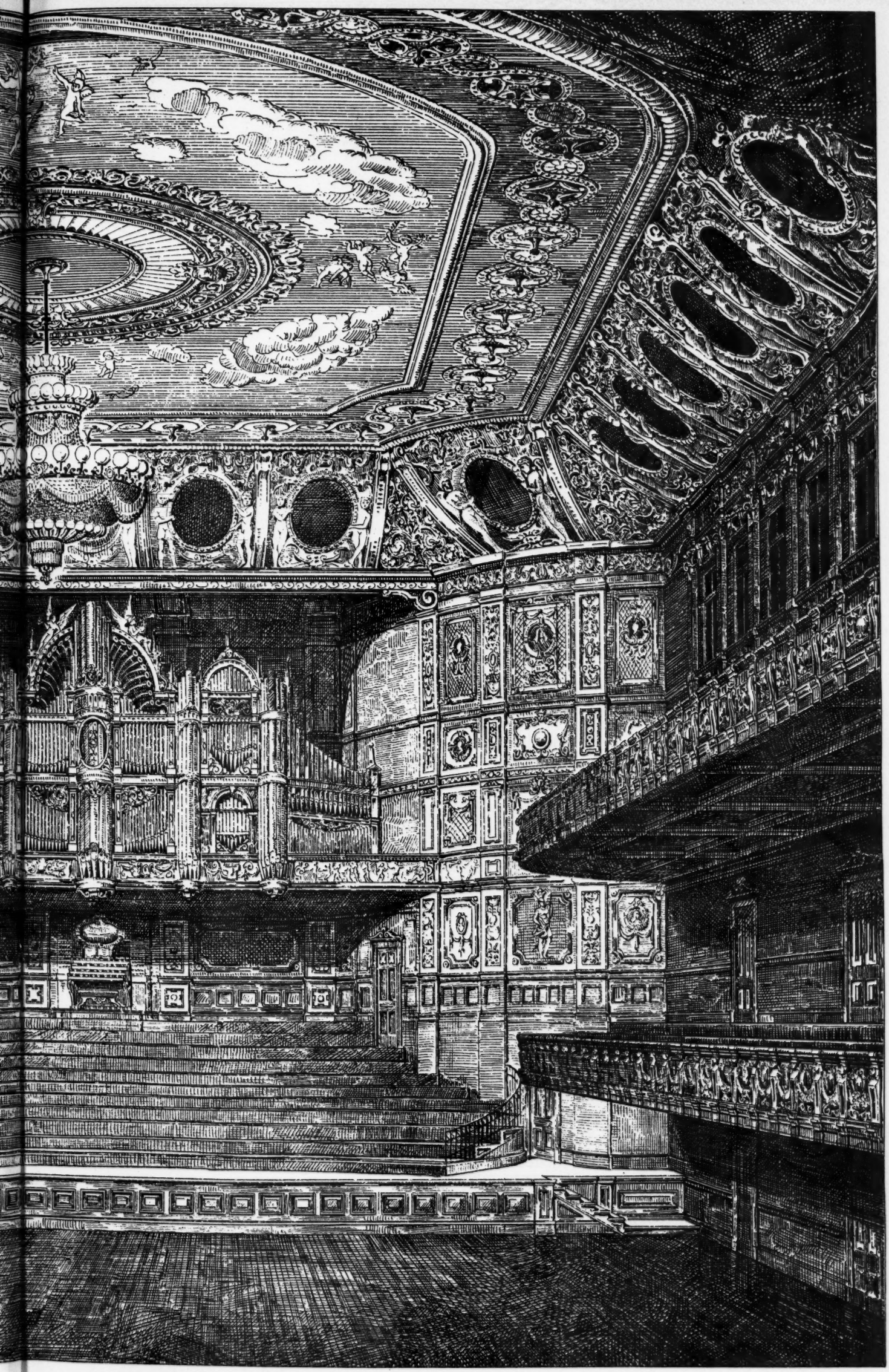

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